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ABSTRACT

The impact that high school and college experiences and activities have on students' musical independence (MI) was investigated. MI is related to the actual production and performance of music, as opposed to musical achievement or the mastery of any academic skill related to music. Colwell's Musical Achievement Test 3, Musical Achievement Test 4, and the Instrumental College Survey-2 were administered to 276 music majors in 3 university bands. Seven statistical treatments were used to identify the relationships between the study's 46 items and student MI. Twelve activities and experiences were identified as important in MI formation, although not all were positive. The 24 items identified as positive for formation of MI were headed by the number of courses in private lessons, grades in ear training, time practicing solos and etudes, grades in theory, and time on other practice. Results suggest that selection of statistical method bears on items identified as having impact. Implications for music instruction are explored. One figure and one table present findings. Appendix A contains the student survey, and Appendixes B through L discuss the statistical methods used. (Contains 18 references.) (SLD)

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ED 378 231

IDENTIFYING AND MEASURING THE ACTIVITIES THAT IMPACT MUSICAL GROWTH FROM HIGH SCHOOL THROUGH GRADUATE SCHOOL

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IDENTIFYING AND MEASURING THE ACTIVITIES THAT IMPACT MUSICAL GROWTH FROM HIGH SCHOOL THROUGH GRADUATE SCHOOL *

I. INTRODUCTION

PROPOSAL WOULD MAKE ARTS A SCHOOL STAPLE, NOT A FRILL
Guidelines Part of Education Reform

Every American high school graduate would be required to have a vigorous working knowledge of dance, music, theater and the visual arts and to be skilled in at least one artistic form, according to new standards expected to be approved by the secretary of education.

Proposed new national standards for arts education were presented to Secretary of Education Richard W. Riley yesterday as part of the broad education reform effort he is pushing through Congress. They were drawn up by a government-sponsored coalition of arts educators, business leaders and performing arts professionals and will be finalized after passage of the education reform bill not in the final stages of approval by Congress.

The guidelines, which would be mandatory by school districts that adopt them, are the first in a series to be developed this year to meet the agenda of the national legislation ***Goals 2000: Education America Act***. After a full-throttled lobbying effort last year, the arts were included in the school reform measure as a core curriculum subject on a equal footing with English, mathematics, science, history, civics, geography and foreign languages.

A sample of the panel's expectations for high school graduates includes:

- The ability to create and answer 25 questions about dance and dancers prior to the 20th century.

- Sing music written in four parts, with or without accompaniment; identify sources of American music genres, such as swing, Broadway musical and the blues, trace their evolution and cite well-known musicians associated with them.

Testing for arts proficiency would eventually be given in grades 4, 8 and 12 and a sampling of students would start in 1996 by the federally funded National Assessment of Educational Progress.

. . . two music teachers . . . "said the national endorsement of the standards would be helpful in the battle to keep music education central to the curriculum. . . . the key was convincing the school administrators that arts are viable in our schools. Without the support of administrators, we can't do it."(Emphasis Added) (Trescott, 1994).

A Washington Post editorial (1994) summarizes the current educational direction for America's schools of the future. Music education will be an integral portion of the educational fabric. The article further notes that students will be evaluated by "singing, identifying, tracing and citing" specific music skills. Arts professionals recognize that without accountability, there is no credibility. "Schools must be accountable for the progress of their students. Those who operate schools need to determine whether students under their charge are learning anything." (Gardner, 1991, p. 141)

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* This paper groups and organizes the study's data reported at earlier educational conferences such as MSERA (Bobbett, et al.) and the NBA (Bobbett, et al.) into one paper examining the collective impact that high school and college experiences have on a student's MI growth.

The Washington Post article tacitly implies that under the Goals 2000: Education America Act, fine arts students should learn to be independent of supervision during the demonstration of their respective arts: dancing, drama, music, etc. Historically, the authors have used the notion of musical independence as the key indicator of student outcomes in music (see references). For example, in the area of instrumental performance, a beginner requires constant instruction, a college student requires some but not constant instruction, and a professional performer requires little instruction: the beginner would be musically dependent on the teacher, the college student would be moderately musically independent, and the professional would be musically independent. [*The authors of this paper make a subtle difference between musical independence (MI) and musical achievement. Musical achievement represents the mastery of any academic skill related to music, but MI is directly related to the actual production and performance of music. The link between knowledge acquisition and the application and use of that knowledge in performance is the key: music knowledge may exist without MI, but MI may not exist without music knowledge.*]

"The artist's work is the making of the emotive symbol. This making involves varying degrees of craftsmanship or technique. The normal evolution of art is in close association with practical skill. Technique is the means to the creation of expressive form" (Langer, 1953, p. 387). What are the important music skills that must be learned for students to become musically independent? And after the important skills are identified, can they be measured with the typical "academic" paper-and-pencil test?

Currently, students planning to become future music educators are exposed to a variety of musical experiences and activities from pubic school training through their college training. Most activities and experiences are endorsed by state and national accrediting agencies, school administrators, school boards, state boards of education and post-secondary certification agencies. High school musicians play their instrument many years and participate in many music activities before attending college. At the high school level, instrumental students participate in a concert ensembles and can audition to participate in *all-state band, all-state orchestra, all-state choir, all-state jazz band,* and *solo-ensemble.* Other musical experiences include *private lessons, high school jazz band, marching contests, concert festivals, community band,* and *church/community choir.*

At the college level, music skills have been organized and departmentalized into specific "core" music education activities. College students are expected to participate in a variety of academic experiences including *private lessons, ear-training, theory, keyboard, music history, conducting, music education, voice/choir, instrumental ensembles,* and *general academics.* During private lessons in college, teachers often emphasize specific instrumental skills including *scales, etudes, thirds/arpeggios, band music, sight-reading, improvisation,* and *"other"* activities such a reed making, breath-control exercises, instrument repair, etc. If progress in educational reform is to take place, we must identify and focus on those elements which are essential in developing musical independence. "To be sure, the question of what to assess and how to assess it remains extremely problematic." (Gardner, 1991, p. 198).

II. BACKGROUND

In the authors' secondary MI research (i.e., 9th or 10th grade through 12th grade), the findings indicated identifiable and measurable differences between average (randomly selected) and outstanding (nominated) instrumental music programs (Bobbett, 1987a and b). Other research examined students and band directors participating in "good" Appalachian high school instrumental programs. The student portion of the project noted a positive relationship between high school music activities such as marching contests, concert festival, solo-ensemble, solos, other ensembles, etc., and the student's MI (Bobbett, 1991a). The band director segment examined the grading procedures that influence a student's musicianship and the relationships that exist between demographic data and band directors' and students' MI (Bobbett, and Bobbett, 1990b).

Student's MI and high school activities that impacted MI were studied from the post-secondary perspective as well. When the students participating in the University of Tennessee band were evaluated (Bobbett, 1989, 1990a), the findings indicated that participation in all-state band, solo-ensemble, concert festival, private lessons, and church/community choir had a positive impact on the student's MI. Researchers expanded the early post-secondary research and examined the students participating in the three instrumental ensembles at Ball State University (Bobbett, 1991b, 1992). The findings suggested positive links between high school activities such as all-state band, concert festival, solo-ensemble, private lessons, and student/program MI. Next, the authors examined the high school music activities in which instrumental students at Ball State University, Florida State University, and Wichita State University participated. The findings suggested that many activities such as high school private lessons and all-state band had a positive impact on the students MI. Music activities that did not have a positive impact included all-state orchestra, all-state jazz band, all-state choir, concert festival, marching contests, church/community choir, and high school jazz band (Bobbett, 1993).

III. PURPOSE

On purpose of this study is to examine the impact high school and college experiences and activities have on the student's MI as measured by Colwell's Musical Achievement Test 3 (MAT3) and Musical Achievement Test 4 (MAT4). A second purpose of the study is to identify important and unimportant activities and experiences as they relate to MI. After examining the instrumental music curriculum for students from public school through college, the third purpose is to organize and group similar musical experiences. The researchers used a variety of statistical treatments when examining these relationships.

IV. TESTS AND QUESTIONNAIRES

The Instrumental College Survey-2 (ICS-2) (see Appendix A), Colwell's Music Achievement Test 3 (MAT3), and Colwell's Music Achievement Test 4 (MAT4) were administered to 354 instrumentalists

participating in Ball State University, Florida State University, and Wichita State University bands. Colwell's MAT3 and MAT4 were used to evaluate the musical independence of the following instrumental programs:

	Ball State University	Florida St. University	Wichita St. University
Top	Wind Ensemble	Wind Ensemble	Wind Ensemble
Middle	Symphonic Band	Symphonic Band	Concert Band
Bottom	University Band	Concert Band	N/A

These ensembles have different missions. The wind ensembles are the top (elite) performing ensembles at each institution. The middle ensembles, comprised of top and average instrumentalists, serve as training organizations, while the bottom ensembles are primarily recreational. To be admitted to an ensemble, the students are evaluated by an audition process; faculty members listen to and evaluate each student's playing skills. The better instrumentalists are selected to perform in the top ensemble.

For preliminary organization of the study, students were asked in the ICS2 to identify their academic major (*i.e., music major (MM) or non-music major (NMM)*), year in school (*freshman, sophomore, junior, senior, graduate student*), instrument family (*woodwind, brass, percussion*), and the top instrumental ensemble in which they participate (first, second, third).

The instrument examined two general areas: student outcome, and general demographic data.

A. **Instrumental College Survey-2**

The ICS-2 **five** areas examined in this study included (see Appendix A):

1. **Number of College Courses** Each student indicated the number of courses taken in each of the 10 course areas. These areas included private lessons (PL), ear training (ET **), theory (TH), keyboard/piano (KP), music history (MH), conducting (CO), general music education (ME), voice/choir (VC), instrumental ensemble (IE), and general academic courses (GA).

2. **Grades in College Courses** Students indicated their average grades in each course taken in each of the 10 course areas (see area 1. above).

** **Item Coding** Throughout the paper, ICSC-2 items are coded by Section [Number of College Courses (B2), College Grades (B3), High School Activities (C4), and Practice Activities (D2)], and by its respective item (e.g., PL = private lessons).

3. **High School Music Activities** Students indicated the number of years they participated in 11 high school music activities. The 11 activities included: all-state band (ASB), all-state orchestra (ASO), all-state jazz band (ASJB), all-state choir (ASC), concert festival (CF), solo-ensemble (SE), marching contests (MC), private lessons (PL), church/community choir (CCC), high school jazz band (HSJB), and community band (CB).

4. **College Instrumental Practice Activities** Students indicated the percentage of time they spent on each of eight instrumental practice activities. The eight activities included: scales (SC), etudes (ET), thirds/arpeggios (TA), band music (BM), sight-reading (SR), solos (SO), improvisation (IM), and other (OT).

5. **Other Academic Experiences** These miscellaneous items reflected a wide range of experiences that might impact the student's MI. Students indicated (a) the percentage of time they used a metronome, (b) the number of minutes they practiced each week, (c) the number of minutes they studied each week, (d) their college grade point average (GPA), (e) the total number of years they have played their instrument, (f) the number of minutes per month they used a audio/video recorder to record and self-examine their instrumental performances, and (g) the number of minutes per week they asked a classmate/friend/faculty member (*excluding private instrumental teacher*) to listen and critique their instrumental performances (see Appendix B).

B. Musical Independence (MI)

The researchers used Richard Colwell's (1970) Music Achievement Test 3 (MAT3) and Music Achievement Test 4 (MAT4) to evaluate the musical independence (MI) of instrumental students participating in the top, middle, and bottom bands at Ball State University, Florida State University, and Wichita State University. MAT3 was selected because the standardization information provided in the Interpretive Manual and the Administrative and Scoring Manual is adequate and the answer sheets are clear, self-explanatory, and easy to grade. Further, it best evaluates the student's musical independence (Bobbett, 1987) and has previously determined reliability estimates. Colwell's MAT4 was selected because it addresses, more directly, some of the concepts of music history and music theory generally covered in the undergraduate music curriculum. Colwell (1970) used the Kuder Richardson 21 (KR21) to evaluate the internal consistency of MAT3 and MAT4 for grades 9-12. The KR 21 ranged from .87 to .89 for MAT3 and from .84 to .89 for MAT4. The MAT 3 consists of four subtests:

1. Tonal Memory (e.g., MAT3, subtest #1 [3ST1]): (20 items) A chord is played on a piano first in block form, and then arpeggiated. The subject determines which tone of the arpeggiated version (four tones) changed. If the two chords are identical, the subject fills in the blank marked "O." Colwell defines this as "the ability to retain the quality of a chord" (p. 100).

2. Melody Recognition (3ST2): (20 items) A melody is first played on a piano and then it is placed in a three-part setting. The subject determines whether the original melody is in the high (H), middle (M), or lower (L), voice. If the subject is in doubt or fails to hear the melody, he fills in the blank marked "?" Colwell defines this as "the ability to follow a melody aurally" (p. 102).

3. Pitch Recognition (3ST3): (20 items) The subject hears the first tone of two written pitches, and afterward hears three additional pitches. The subject indicates which of the three pitches matches the second written pitch. Colwell defines this as "the ability to mentally hear the pitches seen on a page of music" (p. 104).

4. Instrument Recognition (3ST4): (15 items)
Subtest A: (10 items) After listening to a melody played on a particular instrument, the subject identifies, from the four possible choices, the correct instrument. If the four instrument choices do not match the instrument heard, the subject fills in the blank marked "O." Colwell defines this as "the ability to identify solo instruments . . . from an aural example" (p. 106-7).

Subtest B: (5 items) After listening to a melody played on a particular instrument within an orchestra setting, the subject identifies from the four possible choices, the correct instrument. If the four instrument choices do not match the instrument heard, the subject fills in the blank marked "O." Colwell defines this as "the ability to identify . . . accompanied instruments from an aural example" (p. 106-7).

The MAT4[2] consists of "five" subtests:

1. Musical Style: (40 items)
Subtest A: Composer (4ST1): (20 items) After listening to a short orchestral excerpt, the subject selects from four choices the composer whose style most closely resembles that of the musical excerpt. Colwell defines this as "the ability to categorize music as to genre and style" (p. 166).

Subtest B: Texture (4ST2): (20 items) After listening to a short musical composition played on a piano, the subject marks the blank "M" for monophonic, "H" for homophonic, "P" for polyphonic, or "?" to indicate if she is in doubt. Colwell defines this as "the ability to categorize music as to genre and style" (p. 166).

2. Auditory-Visual Discrimination (4ST3): (14 items) After listening and viewing a four-measure melody, the subject fills in a blank below every measure in which the notation is rhythmically different from the melody he hears. If all the measures are correct, he fills in the blank marked "O". Colwell defines this as "the ability to accurately read rhythmic notation" (p. 169-170).

3. Chord Recognition (4ST4): (15 items) A block chord is played on the piano, and afterwards, three trial chords are played. The subject identifies from the three trial chords the one which sounds like the first chord. If none of the three chords are like the first chord, then she fills in the blank marked "O". If in doubt, she fills in the blank marked "?". Colwell defines this as "the ability to recall the sound of a chord, either by listening for its general harmonic characteristics, by recognition of the chord as an entity, or by mentally singing the pitches of the chord" (p. 170-71).

4. Cadence Recognition (4ST5): (15 items) After listening to a short musical phrase played on a piano, the subject identifies the cadence by filling in the blank "F" for full cadence, "H" for half cadence, and "D" for deceptive cadence. If the subject is in doubt, he fills in the blank marked question "?". Colwell defines this as "the ability to distinguish among three common kinds of cadence (full, half, deceptive)" (p. 173-174).

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2. For this study plus other related studies, Colwell's MAT4 subtest 4 (Chord Recognition) was re-organized into two subtests that are reported as MAT4 ST3 and MAT4 ST4.

V METHODOLOGY

The researchers assumed that music majors had more urgency in developing musical skills during high school than did non-music majors. Perhaps realizing the strong possibility of becoming professional music educators or performers, music majors might have participated in high school music activities that were directly linked to the development of MI. Non-music majors might have participated in music activities for reasons other than MI development. Realizing that the comparison between music majors and non-music majors might provide additional insights regarding the evaluation of student outcome, the authors plan to report this analysis in a future report. Non-music majors (n=78) were eliminated from the total participant population (n=354), leaving the music major (n=276) data for the rest of the study.

This is not a longitudinal study; the instrumental postsecondary students were evaluated only once during the spring of 1992 . To provide a fuller portrayal of the study's inter-related issues, inferential statistics were used. By using inferential statistics, the researchers realized that several assumptions were ignored: (a) students were not randomly assigned to the groups, and (b) the variance for each group were not equal (i.e., homogeneity of variance assumption). Therefore, instead of using randomly selected samples, the researchers used the total population of participants.

This is an exploratory study. Different statistical analysis were used to examine the data from a variety of perspectives. Therefore, once an item was identified as have some level of impact on student outcome (MI), additional statistical analysis is used to compare the first analysis with the observations noted in the other statistical analysis.

The five questions posited in this study include:

1. What generalities can be observed when descriptive analysis is used to examine the study's 46 items?

2. What are the strong positive or negative relationships between the musical skills identified by MAT3, MAT4, and Grand Total (GT) MI scores and: (a) the number of college courses, (b) the student's respective grades in these college courses, (c) high school music activities, (d) individual instrumental practice activities, (e) other academic/musical experiences?

3. Using an exploratory model of regression, which items seem to have a significant impact on the student's MI score?

4. After the overlap between the independent variables is eliminated, what is the relationship between the study's 36 items and the subtests, individual tests, or the grand total test?

5. How can study's items be organized into different groupings?

In response to question 1, descriptive analysis was used to examine both the three outcome indicators (*MAT3, MAT4, and the combined grand total score (GT)*), and the study's other 46 items (independent variables). The descriptive analysis included: numbers (n) of responses, mean scores (M), standard deviation (SD), median (MD), minimum, maximum, and range. The kurtosis, skewness, Shapiro-Wilk W test and resulting probabilities were used to examine the normal distribution for each of the study's items.

To answer question 2, the Pearson Product Moment correlation statistic was used to compare each of the three outcome indicators (MAT3, MAT4, and GT) with the study's 46 independent variables.

Using the earlier descriptive data analysis (see Appendix B), 10 items with an "n" smaller 240 were excluded from the remainder of the study. Because the respondents did not answer all of the ICS-2 questions, there were many missing "cells" in the data analysis. Five items were excluded from the "number of courses" area, and the same items were excluded from the "grades in courses" area. The excluded items were: keyboard (KB), music history (MH), conducting (CO), music education (ME), and voice/choir (VC).

To answer question 3, two major types of exploratory statistical analysis were run. **First**, two types of **Stepwise Regression** (*Forward and Backward*) ($p \leq .05$) were used to examine the remaining 36 independent variables with the student's MI. Next, other items that might have a possible impact (*i.e., a large F-score but insignificant F-score*) on MI were noted. **Second**, using the items identified in both the Forward and Backward Stepwise Regression analysis, Multiple Regression statistic was used to examine these items. Next, because of the differences in R^2 between the Stepwise Regression and Multiple Regression, items that were excluded from the original Stepwise Regression but were not significant were added one at a time to see if they would increase the R^2 of the two different Multiple Regression analysis.

In response to question 4, Guttman's Partial Correlation statistic was used to examine the study's items with the MAT3's and MAT4's nine subtests, the two MI tests, and the Grand Total (GT) tests. Both negative and positive correlations were examined. Next, items that had an important ($R^2 \geq 3\%$) impact on the individual subtests, the tests, and the GT test were examined.

Factor Analysis (FA) was used to answer question 5. The Iterated Principal Axis, Roots Greater than 1 was used as the FA model to examine study's items. The Kaiser's Matrix Sampling Adequacy (MSA) was used to examine both the total FA model and the individual items in the model. Next, the Eigenvalues were used to develop a Scree Plot for the magnitude for each of the Eigenvalues. The Proportionate Variance Contribution was used to examine the difference between the Orthogonal and Oblique FA models. The Communality Summary was used to examine the importance of each of the study's items, and the Variable Complexity-Orthotran/Varimax was used to examine the complexity of each of the study's items.

VI. FINDINGS

A. What generalities can be observed when descriptive analysis is used to examine the study's 46 items?

The average MM scored a 60 on the MAT3 and a 72 on the MAT4, with a combined score of 132 on the **grand total** (**GT**) MI tests (see Appendix B). The MAT3 scores ranged from 28 to 75 (75 being a perfect score), while the MAT4 scores ranged from 31 to 88. The lowest GT score was 59 and the highest GT score was 163--representing a 104-point spread between the top and bottom student.

Of 276 participants, the number of responses indicating participation in the study's 46 items ranged from 87 (B3CO: grades in Conducting) to 275 (C4SE: Solo-ensemble and C4CB: Community Band). In the "**Number of College Courses**" area (first 10 items), students had taken more classes in GA (M=8.8), IE (M=6.6), and PL (M=4.7), and fewer classes in VC (M=2.0), CO (M=2.1), and KB (M=2.5). Participation in number of classes varied greatly for ME, IE, and GA (1 to =70). Of the music education classes, PL (0 to 32) and TH (1 to 18) had a large range of participation, while KB (1 to 10), MH (1 to 12), and CO (1 to 12) had a small range of participation. The Kurtosis and Skewness for these 10 items were all positive. The Shapiro-Wilk W test and corresponding probability indicated that all items in this area were not normally distributed.

The "**Grades in College Courses**" area was examined for these 10 courses. The students' mean GPAs for the 10 course areas were all higher than a 3.0. The students earned higher grades in IE (M=4.0), VC (M=3.9), PL (M=3.8), and CO (M=3.8) and lower grades in ET (M=3.2), MH (M=3.2), and GA (M=3.2). Some students earned low grades in PL, ET, TH, KB, MH, and GA (Minimum=1), but all students made passing grades in CO, ME, and VC (Minimum=2), and even higher in IE (Minimum=3). The Kurtosis analysis was positive for most items in this area but not for ET, MH, and GA. The skewness analysis were negative. The Shapiro-Wilk W test and the corresponding probability indicated that the items were not normally distributed.

The **number of years** a student participated in "High School Music Activities" was examined. Students participated more years in SE (M=3.6), MC (M=3.1), and CF (M=2.9), while participating less in ASJB (M=.1), ASC (M=.1), and ASO (M=.3). While some students never participated in any of these activities (Minimum=0), other students participated many years in PL (M=16), MC (M=14), and CCC (M=14). Other than CF and HSJB, all the items in this area had a positive kurtosis, and other than CF and SE, all had a positive skewness. The Shapiro-Wilk W test statistic indicated that none of the items in this area were normally distributed.

Instrumental "**Practice Activities**" were examined. Students practiced a large percentage of time on SO (M=33%), ET (M=21%), and SC (M=13%), and they practiced less on IM (M=4%), OT (M=7%), TA (M=7%), SR (M=7%), and BM (M=8%). Some students never practiced in these areas and

others practiced in these areas more than 40%. One or more students practiced the majority of time on SO (MAX=85%), OT (MAX=80%), and ET (MAX=75%). All items in this area had a positive kurtosis and skewness, and the Shapiro-Wilk W statistic indicated that none of the items were normally distributed.

Finally, **"Other Activities"** (academic and music) were examined. The typical student practiced with the **metronome** 32% of the time; one or more never used a metronome when they practiced and other student/s used it 100% of the time. The typical MM **practiced** 11 hours a week (i.e., 1-1/2 hours/day) and studied academic areas another 6 hours a week (i.e., less than an hour per day). Some student/s never practiced or studied during the week. One student practiced 30 hours per week and another student studied 28 hours a week. The average MM received a strong B average (M=3.3, median=3.3) and had played his/her instrument an average of 9 years. The typical MM used a tape-recorder 26 minutes per month and asked a friend/classmate/faculty member (excluding their instrumental private teacher) to critique their instrumental performance 24 minutes per month. Other than metronome usage, all the items in this area had a positive kurtosis and, other than their college GPA item, were positively skewed. The Shapiro-Wilk W statistic indicated that none of the items in this area was normally distributed.

B. **What are the strong positive or negative relationships between the musical skills identified by MAT3, MAT4, and Grand Total (GT) MI scores and: (a) the number of college courses, (b) the student's respective grades in these college courses, (c) high school music activities, (d) individual instrumental practice activities, and (e) other academic/musical experiences**?

The Pearson Product Moment statistic was used to compare MAT3, MAT4, and the Grand Total (GT) scores with the study's 46 independent variables. In Table 1 (see Appendix C for complete data analysis), the important (r>.20) independent variables that reflected an impact on the student outcome were organized and grouped by either their positive or negative impact on MI.

Seven items had a significant, positive correlation with the student's MI. Five of the seven were in the area of **"number of college courses"**. The analysis suggests that the number of classes in PL (r=.41), IE (r=.36), MH (r=.27), GA (r=.23), and KB (r=.21) had a meaningful impact on the student's MI. In addition, the number of years a student participated in CF (r=.26), and the percentage of time the student practiced ET (r=.24) also had an impact on his/her MI.

Of the study's 46 items, 13 received a significant, negative correlation with the student MI score. The number of years a student participated in ASJB and the number of a hours a student studied academic skills received the largest negative correlation with MI (r= -.81, -.51, respectively). Seven of the 13 negative correlations were in grouped in the **"high school music activities"** area: ASJB (r= -.81), HSJB (r= -.40), ASO (r= -.35), CCC (r= -.34), MC (r= -.26), ASC (r= -.25), and ASB (r= -.22). Note that all four of the state-sponsored music activities were identified (i.e ASJB, ASO, ASC, and ASB). The number of hours a

Table 1 Items with a significantly positive and negative correlation (r) between the study's 46 items and MAT3, MAT4, and the GT test score.

	Positive					Negative				
	Item	MAT3	MAT4	GT	%	Item	MAT3	MAT4	GT	%
		r	r	r	r^2		r	r	r	r^2
1	B2 PL	.42	.39	.41	17%	1 C4 ASJB	-.76	-.81	-.81	66%
2	B2 IE	.37	.32	.36	13%	2 B1b. Study	-.48	-.51	-.51	26%
3	B2 MH	.23	.29	.27	7%	3 D1 Metronome	-.41	-.39	-.41	17%
4	C4 CF	.19	.30	.26	7%	4 C4 HSJB	-.45	-.34	-.40	16%
5	D2 ET	.20	.25	.24	6%	5 C4 ASO	-.37	-.31	-.35	12%
6	B2 GA	.12	.31	.23	5%	6 C4 CCC	-.37	-.30	-.34	12%
7	B2 KB	.18	.22	.21	4%	7 D2 SR	-.38	-.26	-.32	10%
			Total		59%	8 C4 MC	-.23	-.27	-.26	7%
						9 C4 ASC	-.31	-.19	-.25	6%
						10 B3 CO	-.26	-.20	-.24	6%
						11 B3 ME	-.17	-.25	-.22	5%
						12 C4 ASB	-.23	-.20	-.22	5%
						13. B3KB	-.10	-.30	-.21	4%
								Total		192%

student studied (r= -.51) and the grades the student received in CO (r= -.24) and ME (r= -.22) show a negative impact on the student's MI. Also, the percentage of time the student used a metronome (r= -.41) and the percentage of time the student practiced SR (r= -.32) had a negative impact on MI.

When the 46 items are examined collectively, 28% of the items reflect a **negative** impact on MI, while only 15% of the items suggest a **positive** impact on the student's MI. When items that made a positive and/or negative impact on MI were grouped by the four different areas of the study, 11% (i.e., 5 of 46 items) were identified in the "number of college courses" area, 6% (3 of 46 items) were in the "grades in college courses" area, 17% (8 of 46 items) came from the "high school music activities" area, and 9% (4 of 46 items) of the items came from the "practice and other activities" areas.

Each "r" was converted to an "r^2" and examined. After the positive and negative r^2's were summed, the positive items collectively accounted for 59% of the variance between the positive independent variables and the negative items accounted for 192%. Since the collective negative items (192%) and the total items (251%) accounted for more than 100%, the Pearson Product Moment correlation analysis suggests a "collinearity" issue regarding the study's 46 independent variables (see "Collinearity" discussion later in this paper).

Table 1 illustrates that the "r" for MAT3 and MAT4 are similar. When the MAT3 has an "r" larger than .20, the MAT4 usually reflects a similar "r". Likewise, when one "r" for the MAT3 is negative, the "r" for the MAT4 is also negative.

C. Using an exploratory model of regression, which items have a significant impact on the student's MI score?

1. **Stepwise Regression (Forward and Backward)**

Although 10 items were excluded earlier because of small "n"s, when the Stepwise Regression-Forward was applied, 167 respondents had complete data (i.e., no missing cells). Both the Forward and Backward Stepwise Regression statistical models ($p \leq .05$) were applied to the 36 remaining items (see Appendix D-Forward; Appendix E-Backward). Five items were identified to have a significant impact on MI, including: (1) number of classes for PL, (2) college grades in ET, (3) number of years in ASJB, (4) the percentage of time a metronome was used during practice, and (5) the student's college GPA. While PL, ET, and Col. GPA received positive coefficients, ASJB and Metronome usage were negative. Although the resulting R was .62, the adjusted R^2 was .36, meaning that these five items identified in the Stepwise Regression-Forward accounted for 36% of the variance between the independent variables and student outcome. Six other items with a large, but not significant F-score included: percentage of time spent during practicing on OT, number of years in ASO, number of years in HSJB, percentage of time spent on SO, number of years in high school taking PLs, and the grades in TH.

The Stepwise Regression-Backward (Appendix E) statistical analysis was used to identify eight items that had a significant impact on MI: (1) number of classes in college the student took PLs, (2) college grades in ET, (3) college grades in TH, (4) number of years participation in ASO, (5) number of years participating in ASJB, (6) number of years in high school taking PL, (7) percentage of time the student practiced SO, and (8) the percentage of time the student practiced with a metronome. Of the 276 MMs, 167 had complete data. The R was .65, and the adjusted R^2 was .39, or 39% of the variance between the independent variables and the dependent variables was accounted for. Five of the items received a positive coefficient, and ASO, ASJB, and Metronome usage was negative. Six additional items with a large but not a significant F-score included: (1) percentage of time the student practiced ET, (2) the percentage of time the student practiced OT, (3) the total number of years the student played their instrument, (4) the number of years in high school the student participated in CCC, (5) the number of years the student participated in ASB, and (6) the number of years the student participated in HSJB.

Appendix F is a visual summary of both Stepwise Regression-Forward and Stepwise Regression-Backward for the items that are important and unimportant. Note that C4ASC, C4SE, and D2SC were neither important nor unimportant.

2. **Multiple Regression**

a. **Using Stepwise Regression-Forward independent variables**

Multiple Regression (MR) statistic was used to examine the impact selected independent variables had on MI (see Appendix G: Multiple Regression-5 variables from Stepwise Regression--Forward) . First, using the five variables identified by the **Stepwise Regression (Forward) Regression** statistic, the Multiple Regression statistic was used to examine the data. The "n" for the MR statistic was 231, the R was .54, and the adjusted R^2 was .28--an 8% difference between the Stepwise Regression-Forward (36%) and the MR (28%) statistic. The resulting F-score from this regression model was 18.59, while the resulting probability suggested a strong significant (p≤.0001) impact on MI by these five identified variables. Note that the probability for the Beta Coefficient Table for the item "metronome usage" was .46, and the Partial F score was .54 (i.e., not significant). This analysis also indicated that the other four items received a large F-score and were significant with MI. The Durbin-Watson (DW) residual was 0.574, which further suggests that there is a positive (≤1.5) serial correlation. That is, the independent variables are not "statistically independent".

b. **Using Stepwise Regression-Backward independent variables**

The eight independent variables identified by the Stepwise Regression (Backward) statistic was examined by the Multiple Regression statistic (see Appendix H-Multiple Regression-Stepwise Reg., Backward). The "n" for this model was 243, the R was .57 and the adjusted R^2 was .30, suggesting that 30% of the variance between these eight variables and the dependent variable was identified. The ANOVA statistic indicated that the F-score was 14.03, with a strong significant (p,.0001) relationship between these eight variables and MI. The Beta Coefficient probability analysis plus the Confidence intervals and resulting Partial F-scores indicated that while six of these variables had a strong impact on MI, the *number of years a student participated in ASO*, the *number of years the student took PLs in high school*, and *the percentage of time a student used a metronome during practicing* did not have a significant impact on MI. Note that while five of the eight items were positive, three were negative: *number of years in ASO*, *number of years in ASJB*, and the usage of a *metronome during practicing*. The Durbin-Watson W test analysis of .69 suggests that the eight variables in this MR model were not independent.

3. **Exploratory: Multiple Regression (Appendix I)**

Because the resulting R^2's found in the Multiple Regression models (28%, 30%, respectively) were smaller than the R^2's observed in the Stepwise Regression analysis (36%, 39%, respectively), then some of the items not identified as significant in either of the Stepwise Regression analysis models might be added to an experimental MR model. This might increase the resulting R^2's and improve the

autocorrelation as measured by the Durbin-Watson W test statistic (closer to range of 1.5 to 2.5). To perform this exploratory MR analysis, items with a small F-score or resulting probability less that .05 would be eliminated, and items with a large F-score and a higher probability were added.

Initially, six items were included in the exploratory MR model: (1) *number of years a college student took PLs*, (2) *college grades in ET*, (3) *number of years in college in TH*, (4) *number of years a high school student participated in ASJB*, (5) *student's College GPA*, and (6) *percentage of time spent practicing SO* . The experimental MR analysis used the items found in the Stepwise Regression (Forward) and Stepwise Regression (Backward) but reinforced in the respective MR analysis with the largest F-score plus a significant probability. The R was .56, and the resulting adjusted R^2 was .29, with a F-score of 16.61 and a probability of .0001.

At the beginning of the exploratory portion of the MR analysis, the researchers selected items identified in either the Stepwise Regression (Forward) or Stepwise Regression (Backward) that were not significant at the .05 level but contained a large F-score. A trial-and-error MR analysis followed, where all items were eventually included into the MR model, but then excluded if the Beta Coefficient probability was not significant ($p \leq .05$).

Seven items were identified in the exploratory MR model: (1) number of years a student took private lessons in college (B2PL), (2) the student's college grades in ET (B3ET), (3) the student's college grades in TH (B3TH), (4) the number of years in college a student participated in ASJB (C4ASJB), (5) the percentage of time they spent practicing SO (D2SO), (6) the percentage of time they practiced ET (D2ET), and (7) the percentage of time they spent in OT (D2OT). The "n" was 240, the R was .60 and the adjusted R^2 was .34, or 34% of the variance between the seven independent variables and the dependent variable was explained. The remaining 29 independent variables were excluded from the exploratory MR model because their addition to the model did not reflect a significant probability noted in the Beta Coefficient analysis. The R^2 computed in the experimental MR analysis (34%) was larger than either of the other MR analysis (28%, 30%, respectively). The Durbin-Watson W analysis also improved slightly from .57 or .69 to .78--a marginal increase.

D. After the overlap between the independent variables is eliminated, what is the relationship between the study's 36 items and the subtests, individual tests, and the grand total test?

1. Subtests

Neither the Pearson Product Moment, Stepwise Regression (Backward and Forward), or the three Multiple Regression (i.e., 5 independent variables identified by SR-Forward, 8 variables identified by SR-Backward, and Exploratory MR) models accounted for collinearity, or the overlap between the independent variables. The different R^2s from the three statistical procedures suggests that many of the independent variables are truly "discrete"; i.e., that the variables do not reflect many of the underlying issues examined and identified by some of the other independent variables.

Guttman's Partial Correlation was used to examine the study's 36 independent variables and their impact on MAT3 and MAT4 subtests, the individual tests (i.e., MAT3 and MAT4), and the Grand Total (GT) test. For discussion purposes, the correlation of determination ("r") was converted to the percentage of influence ("r^2 converted to percentage (%) of variance between the independent variable and the dependent variable).

The Partial Correlation statistic was used to examine the nine subtests with each of the 36 variables. As illustrated in Appendix J, positive correlations were not shaded and the negative correlations were shaded. Many of the study's items reflected a negative "r", especially in the Number of College Courses area, the Grades in these college courses area, High School Music Activities area, and the "Other" Activities area. Note the large number of negative correlations (*i.e., shaded area in Appendix J)* in the State sponsored high school activities (e.g., ASB, ASO, ASJB, ASC, and CF) area. Practice Activities was the single area where the PC analysis reflected comparatively few items with a negative "r". Note that of the nine subtests, **Instrument Recognition** (i.e., MAT3-ST4) is where most of the items are shaded. This observation appears to validate the study's Partial Correlation analysis, for it seems reasonable that college students are not exposed to a variety of other instruments while practicing.

The issue of positive and negative "r"s was further examined. The items reflecting a **positive** "r" included the number of years the student took *private lessons* (B2PL, 8 of 9 analysis), *ear training* (B2ET, 8 of 9), the student's grades in *ear training* (B3ET, 9 analysis), *theory* (B3TH, 8 of 9), the percentage of time the student practiced *sight-reading* (D2SR, 9 analysis), *solos* (D2SO, 8 of 9), and the student's *college GPA* (A7 Col. GPA, 9 analysis). Items reflecting a **negative** "r" included the number of years the student took *theory* (B2TH, 9 analysis), the number of years the student participated in *All-State Orchestra* (C4ASO, 8 of 9 analysis) and *All-State Jazz Band* (C4ASJB, 8 of 9 analysis), and the number of *years the student played their instrument* (A4. Yrs/Inst., 8 of 9 analysis).

Important (≥3%) relationships between the study's items and the nine subtests were examined. *Melody Recognition* (MAT3, ST2, 9 items), *Pitch Recognition* (MAT3, ST3, 9 items), and *Instrument Recognition* (MAT3, ST4, 6 items) were the three subtests containing the most items that seemed to impact the study's 36 items. Subtests that did not appear to have a strong relationship to the study's items included *Audio-Visual Discrimination* (MAT4, ST3, 1 item), *Tonal Memory* (MAT3, ST1, 2 items), *Texture* (MAT4, ST2, 2 items), *Cadence* (MAT4, ST5, 2 items), and *Composer* (MAT4, ST1, 3 items).

Study items identified as important (≥3 times) included grades in *Ear Training* (B3ET, 5 times) and *Instrumental Ensemble* (B3, 3 times), high school participation in *Church/Community Choir* (C4CCC, 3 times) and *High School Jazz Band* (C4HSJB, 3 times), and the *number of years a student had played their instrument* (A4. Yrs/Inst., 3 times). The remaining 31 items were identified as important two or fewer times by the nine subtests--17 of the 31 study items were never identified as important by any of the nine subtests.

2. Tests (MAT3 and MAT4)

The Guttman's Partial Correlation was used to examine the relationships between the MAT3/MAT 4 and the study's 36 items. Fourteen items in the correlation of determination ("r") analysis reflected a negative "r" for MAT3, and 15 items in MAT4. When the important (≥3%) items impacting the two tests were examined, 10 of 36 items were identified important in MAT3, while 3 of 36 items in MAT4 were identified as important. The number of years the student took private lessons (B2PL) and the student's grades in ear training (B3ET) were the two items identified important by both MAT3 and MAT4.

3. Grand Total (GT) Test

The five items that appeared to have a positive impact (≥3%) on MI included the number of semesters the student took *private lessons in college* (B2PL, +5%), the student's grades in *ear training* (B3ET, +10%), and the percentage of time the student practiced *Etudes* (D2ET, 3%), *Sight-Reading* (D2SR, 3%), and *Solos* (D2SO, 4%). The items that seemed to have a negative impact on MI included the number of years the student participated in All-State Orchestra (C4ASO, 3%), All-State Jazz Band (C4ASJB, 4%), and Church/Community Choir (C4CCC, 3%), and the number of years the students played their instrument (A4. Yrs/Inst., 3%). The remaining 27 items did not have a major impact on MI, and 10 of these items appeared to have a zero impact on MI, including: the number of courses in Instrumental Ensemble (B2IE) and General Academics (B2GA), the number of years the student participated in *Concert Festival* (C4CF), *Marching Contests* (C4MC), and *Community Band* (C4CB), the percentage of time the student practiced *Scales* (D2SC), *Band Music* (D2BM), and "other", plus the time per week the students *practiced their instrument* (B1a. Pract.), the amount of time they spent *studying per week* (B1b. Study), and the minutes per week they *recorded themselves* with a tape recorder.

E. How can the study's items be organized into different groupings?

As a preliminary factor analysis procedure, Kaiser's matrix sampling adequacy was computed. This procedure indicated that the FA model consisted of independent variables (MSA=.536). Next, Eigenvalues and proportion of original variance were developed for 18 values. The Scree Plot was developed to illustrate the magnitude for the 18 values (see Appendix L). Six values reflected a magnitude greater than 1.0. Finally, Eigenvectors were developed for each of the study's 36 items for each of the six vectors.

1. Thirty-six items are grouped by six Factors

The Iterated Principal Axis Orthotran/Varimax method of factor analysis (FA) with roots greater than one was used to organize and group the study's 36 items (see Appendix K). The Kaiser's Variable Sampling Adequacy was run with a matrix sampling adequacy (MSA) of .536, which indicated that the

model generally consisted of independent variables. Items with a low MSA (≤.500) included the percentage of time a student practiced: *other* things (D2OT=.15), *scales* (D2SC=.17), *improvisation* (D2IM=.19), and *solos* (D2SO=.23).

Although the Iterated Principal Axis statistical method identified 18 values, 6 values had a magnitude larger than one. These six values collectively accounted for 37% of the variance. Note that the 37% found in the factor analysis statistical method is very similar to variance found in the Stepwise Regression-Forward (36%), Stepwise Regression-Backward (39%), and the Exploratory Multiple Regression (34%). The Scree Plot (see Appendix K) illustrated the magnitude for these six values.

The Orthogonal Transformation Solution-Varimax was used to group the 36 items into **six** Factors. Obviously, Factors 1 and 2 are the most dominant (i.e., Magnitude=4.3, 3.0, respectively), while Factors 3 through 6 are about half the strength of Factors 1 and 2 (Magnitude=1.8, 1.7, 1.2, 1.0, respectively).

After reviewing the items identified in each for the study's six factors, the authors assigned a descriptor term or label to each Factor. In addition, the authors offered a possible explanation for the items identified in each of the Factors. All of the study's items that load to a particular Factor, or items with an "r" greater than .21, are identified in a Factor and discussed below.

a. Number of College Courses (Factor 1)

Factor 1 can be labeled as number of college courses and accounts for 29% of the factor analysis model. Items grouped in Factor 1 included: number of *private lesson* classes (B2PL= .91), number of *theory* classes (B2TH=.87), number of *instrumental ensemble* classes (B2IE=.80), number of *ear training* classes (B2ET=.74), and the number of *general academic* classes (B2GA=.53). Other items that reflected a relationship to Factor 1 included: *the number of years students played their instrument* (A4. Yrs/Inst=.64), *the percentage of time a student used a metronome* (D1 Metronome=.21), and *the amount of time a student doesn't study academic skills (B1b.25).* Simply stated, if students had not taken many college courses, the student spend a lot of time studying, but as he progresses to the more advance years in college, the student actually spends less time studying. For the total factor analysis model (36 items), Factor 1 accounted for 29% of the variance.

b. College Grades (Factor 2)

The items grouped in Factor 2 can be labeled as college courses and account for 22% of the FA model. These items related to the student's college grades which included grades in: *theory* (B3TH=.77), *general academics* (B3GA=.70), *ear training* (B3ET=.57), *instrumental ensemble* (B3IE=.28), and *private lessons* (B3PL=.26). Other items that relate to Factor 2 included the student's *College GPA* (r=.91), and to a much lesser degree, the number of years a student attended *All-State*

Band (C4ASB), and the number of years a student had not played in *Marching Band* in high school (C4MC= -.21), and the degree that they did not emphasize *sight-reading* during practicing (D2SR= -.22).

c. Individual Study Activities (Factor 3)

Factor 3 can be labeled as individual study activities an this factor accounts for 13% (*Orthogonal*) of the total FA model. *Note that Factors 3 through 6 are approximately half as important in the FA model as Factors 1 and 2.* The percentage of time spent practicing *solo's* during practicing (D2SO=.-1.08) is the primary item identified in Factor 3. Other items with a dramatically smaller impact on Factor 2 included: the number of years a student participated in *All-State Jazz Band* (C4ASJB=.34), the percentage of time a student practices etudes (D2ET=.34), the number of hours a student *studies* each week (B1b.Study=.25), and the percentage of time they practice *sight-reading* (D2SR=.27). Simply, if a student practices solos a large percentage of time, they study less, did not participate in ASJB, and de-emphasize ET and SR.

d. High School Music Activities (Factor 4)

High school music activities are were generally grouped and labeled as Factor 4 and account for 15% (*Orthogonal*) of the total FA model. The items grouped in Factor 4 included the number of years a student participated in *all-state choir* (C4ASC: r=.56), took high school *private lessons* (C4PL: r=.54), *all-state band* (C4ASB: r=.51), *all-state orchestra* (C4ASO: r=.37), *church/community choir* (C4CCC: r=.32), and *concert festival* (C4CF: r=.29). Other items not grouped in Factor 4 but having a similar impact on Factor 4 include the number of years a student participated in *all-state jazz band* (C4ASJB: r=.28), and the percentage of time they practiced *solos* (D2SO: r=.22). Note that the two high school activities not identified in Factor 4 included the number of years a student participated in *community band* (C4CB: r=.00) and the number of years the student participated in *high school jazz band* (C4HSJB: r=.12).

e. Critical Evaluations (Factor 5)

The student's critical evaluations is the descriptor assigned to Factor 5 which accounts for 11% of the total FA model. Items identified in Factor 5 include the *number of minutes a student recorded themselves per month* (D7 MIN/audio: r=.63), the *number of hours they practices each week* (B1a Practice: r=.48), the number of minutes per week they ask *another person to listen to their instrumental performance* (D8 MIN/person listening: r=.34), the number of years a student did not participate in *marching band* (C4MC: r= -.34) and *high school jazz band* (C4HSJB: r= -.28), the percentage of time they practiced *thirds/arpeggios* (D2TA: r=.25), and to a lesser degree, the percentage of time they practiced with a *metronome* (D1 Metro.: r=.23), and the percentage of time the student practiced "*other*" (D2OT: r=.20). Note that the percentage of time the student did not practice *sight-reading* (D2SR: r= -.24) also related to Factor 5.

f. Musical Maturity (Musical Philosophy and Enlightenment) (Factor 6)

Factor 6 was labeled Musical Maturity (i.e., musical *philosophy* and *enlightenment*) and accounted for the smallest percentage of variance for the total FA model (10%). The five items grouped in Factor 6 were the percentage of time a student practiced *band music* (D2BM: r= .48), the percentage of time the student did not practiced *scales* (D2SC: r= -.42), practiced *sight-reading* (D2SR: r=.40), and the percentage of time the student did not practice *scales* (D2SC: r -.42). Items that were grouped with Factor 6 but had a nominal impact included *improvisation* (D2IM: r=.16), participated in *community band* (r=.10), Five additional items not grouped in Factor 6 but were primarily grouped in Factors 1 through 5 included the *number of minutes per week the student asked another student to listen to their instrumental performance*, and the lack of participating in an *instrumental ensemble* (B2IE: r= -.24), grades in *theory* (B3TH: r= -.23), the percentage of time not practicing *etudes* (D2ET: r -.33), and not participating *all-state band* (C4ASB: r -.30). Simply, if student participated ASB, practiced ET and SC, participated in IE, and had good grades in TH, they do not practice IM, SR, IM and participate in CB.

2. Communality Summary

In the Communality summary table, both the squared multiple correlations (SMC) and the Final Estimate are reported (see Appendix K, p. 3). Items with the largest Final Estimate included practicing *solos* (D2SO=1.30–*note Heywood effect or an "r" ≥ 1.0*), student's college *grade point average* (A7. Col GPA=.87), number of courses in *private lessons* (B2PL =.86), and the number of courses in *theory* (B2TH=.81). Items that reflected little or no impact on the FA model included participation in *community band* (C4CB=.02), percentage of time practicing *improvisation* (D2IM=.07) and *other* (D2OT=.08), the number of years participating in *church/community choir* (CCC=.12), *concert festival* (C4CF=.13), and *high school jazz band* (C4=.14).

3. Variable Complexity-Orthotran/Varimax

The Variable Complexity-Orthotran/Varimax was examined for the study's 36 items. Items with the most complexity included percentage of time the student practiced *scales* (D2SC=.3.4) and *improvisation* (D2IM=.3.4), the percentage of time the student practiced with a *metronome* (D2Metro.=3.2), and the number of years he/she participated in *all-state jazz band* (C4ASJB=3.2) and *high school jazz band* (C4HSJB=3.1). Except for one item in Factor 2 and two items in Factor 4, all other items in Factors 1 (Academic Experience [number of college courses]), Factor 2 (Student Outcome [College Grades]), and Factor 4 (High School Music Activities) were not complex, while most items in Factor 3 (Student Activities), Factor 5 (Critical Evaluation), and Factor 6 (Musical Maturity (i.e., philosophy/enlightment)) were complex (≥2.0). In addition, when the Variable Complexity for the Oblique was compared to the Orthogonal statistic, there was very little difference between the two FA statistics.

VII. CONCLUSIONS

Seven statistical treatments were used to examine the relationship between the study's 46 items and student MI. They were: Pearson Product Moment correlation, Stepwise Regression (both Forward and Backward), Multiple Regression (both Forward and Backward), Exploratory Multiple Regression, and Guttman's Partial Correlation. The reader should reference Appendix L--a summary of the different statistical treatments--while reviewing the study's conclusions.

A. There are 12 activities/experiences which seem to play important roles in developing MI.

At the beginning of this study, 46 items were identified that might have an important impact on student MI. After the Pearson Product Moment correlation analysis and the descriptive analysis were run, 10 items were excluded because of small "n"s (the number of years in Music history (B2MH) was the only item with an "r" greater than .24 while the other 9 items that were eliminated had an "r" smaller than .24). After Stepwise Regression (forward and backward), Multiple Regression (forward and backward), Exploratory Multiple Regression, and Guttman's Partial Correlation statistical analyses were run, of the remaining 36 items, only 12 items were identified more than once by the 7 statistical treatments as having an impact on MI. 24 of the study's items were identified as having little to no impact on MI. The 12 items that appear to have the largest significant ($p \leq .05$) impact on MI included:

1. the number of semesters the student took private lessons (B2PL, 7x-positive),
2. the number of years the student participated in All-State Jazz Band (C4ASJB, 7x-negative),
3. the student's grades in ear training (B3ET, 6x-positive),
4. the percentage of time the student practiced solos (D2SO, 4.5x-positive),
5. the percentage of time the student practiced etudes (D2ET, 3.5x-positive)
6. the student's grades in theory (B3TH, 3.5x-positive),
7. the student's college GPA (A7. GPA, 3x, 2x-positive, 1x-negative),
8. the number of years the student participated in All-State Orchestra (C4ASO, 2.5x-negative),
9. the number of years the student participated in Church/Community Choir (C4CCC, 2.5x-negative),
10. the percentage of time the student practiced other (D2OT, 2x-positive),
11. the number of years the student participated in High School Jazz Band (C4ASB, 2x-negative), and
12. the percentage of time the student practiced sight-reading (D2SR, 2x, 1-positive,1-negative).

B. Not all activities/experiences have a positive impact on MI. Some have a negative impact.

Participation in an activity or an experience does not always translate into a positive experience. Although music educators might assume a positive link between an individual activity (e.g., all-state band, community band, practicing improvisation, etc.) or area (e.g., Number of courses, Grades, High

School Activities, Practice activities) and MI, more often than not, the link does not exist. Students do not benefit equally from all activities or experiences.

1. Activities and experiences that had a **positive** impact on MI.

Of the student's 46 items, and using the Pearson Product Moment correlation statistic, 24 items received a positive "r" (see Appendix C). Of these items, six items were identified two more times (i.e., significant at the .05 level) by the study's seven statistical treatments (see Appendix L), suggesting a positive impact on MI. These six items include:

1. the number of **courses** in private lessons,
2. the student's **grades** in ear training,
3. the percentage of **time** the student practiced solos,
4. the percentage of **time** the student practiced etudes,
5. the student's **grades** in theory, and
6. the percentage of **time** the student practices "other."

Other items having a marginally positive impact (moderate F-score) on MI include:

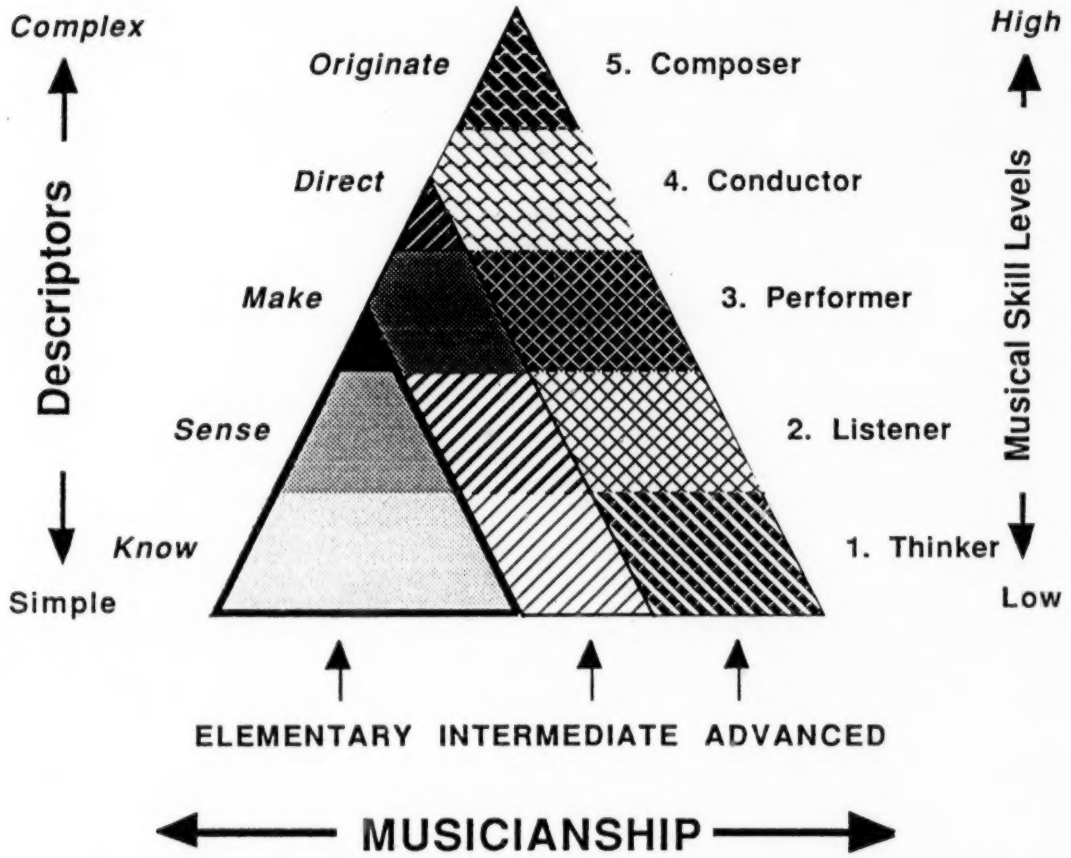
1. the number of **years** playing an instrument,
2. the number **courses** in instrumental ensemble,
3. the number **courses** Music History,
4. the number of **years** the student participated in Concert Festival,
5. the number of **courses** in voice/choir,
6. the number of **courses** in theory,
7. the number of **courses** in general academics,

Some generalizations can be made after reviewing the items with a positive impact on MI. When examined collectively, grades and time-on-task in an activity appear to be two broad issues relating to MI.

Ear-training (auditory), theory (cognitive), and the practice of solos and etudes (performance/psycho-motor) are high level skills. The common **denominator** running throughout these activities is the mastery of the basic melodic and harmonic constructs of western music, namely: scales, thirds, and arpeggios, through time-on-task (see Figure 1, p. 22). The primary focus of private lessons is the development of these essential fundamentals and their application in the performance of etudes and solos. Scales, thirds, and arpeggios are the essential fundamentals of MI and are the foundation for the development of MI skills.

The FA Model (see Appendix K) further supports the importance of fundamentals and the grouping of these activities together. Note that in Factor 6 (Musical Maturity) playing in an instrumental ensemble (r= -.24), all-state band (r= -.30), grades in theory (r= -.23), practicing scales (r= -.42), etudes

Figure 1. Hierarchy of Musical Independence (MI), Bobbett, 1989)



(r= -.33), and thirds/arpeggios (marginally: r= -.20) are all related to the single factor of essential fundamentals.

2. Activities/experiences that had a **negative** impact on MI.

Some music activities and experiences appear to have a negative impact on the student's MI growth. Four items, covering the full gamut of music activities and experiences, were identified two more times (i.e., significant at the .05 level) by the study's seven statistical treatments (see Appendix L), suggesting a negative impact on MI. These four items include:

1. the number of **years** the student participated in All-State Jazz Band,
2. the number of **years** the student participated in All-State Orchestra,
3. the number of **years** the student participated in Church/Community Choir,
4. the number of **years** the student participated in High School Jazz Band.

Other items having a marginally (moderate F-score) negative impact on MI include:

1. the number of **years** the student took private lessons while in high school,
2. the number of **years** the student participated in All-State Band,
3. the student's **grades** in Conducting,
4. the number of **years** the student participated in All-State Choir,
5. the percentage of **time** the student practiced with a metronome,
6. the number of **minutes** a student studied [books],
7. the percentage of **time** the student practiced improvisation,
8. the number of **years** the student participated in marching contests.

Two areas appeared as having both positive and negative effects on MI, depending on the statistical method being employed. These multiple relationships can be explained by the principal of collinearity.

1. the student's college GPA, 2+, 1-
2. the percentage of **time** the student practiced sight-reading, 1+, 1-

When the negative items are examined collectively, honor-group activities appear to be the common thread. Four of these items (ASJB, ASO, CCC, and HSJB) suggest a negative relationship between MI and the number of years a student participated in a high school activity, while four additional high school items (PL, ASB, ASC and MC) suggest a marginally negative relationship to MI. Are not the more MI students participating in all-state groups? Do these high school and all-state activities serve more as motivational, recreational, social and/or reward activities? What impact should this information have on what and how we teach?

All-State Jazz Band is the only activity identified as having a negative impact on MI by all seven statistical treatments (see Appendix L). While the performance of jazz and improvisation, at a professional level, is very structured and demanding, the same can not always be said of jazz and improvisation at the high school or college level. Young, musically immature students are often introduced to the demands of improvisation and the complex styles of jazz before they have a strong foundation in essential fundamentals skills. This premature emphasis on jazz and improvisation might account for the negative impact they have on the development of MI. The inspirational and creative aspects of improvisation might be better served if the student had a stronger fundamental background from which to depart.

The attainment of a high GPA in college is largely knowledge based rather than skill or concept based. While academia often promotes a high GPA, the fact remains that there is little relationship between college grades and any thing outside of college. It is not surprising that grades, when based on knowledge, make little sense in music. "Progress in music seems unrelated in any straightforward way to progress in other symbolic domains." (Gardner, 1991, p. 73) The aquisition of knowledge is only a prerequisite to the application of that knowledge in musical performance. Music performance, or MI, is the application of musical skills and knowledge. Students often earn passing grades by "cramming" before written exam. The same is not true for instrumentalist who must develop and maintain performance/psycho-motor skills on a daily basis.

C. The selection of statistical treatments has an important impact on the study's conclusions.

This study used seven statistical treatments to examine the impact 36 (primary) independent variables had on the student's MI. Items identified as important by the Stepwise Regression statistic (both Forward and Backward) were not consistently verified when the Multiple Regression (three different analyses) or the Guttman's Partial Correlation statistics were used to examine the same items. For example, when examining the percentage of time the student practiced with a metronome, the Stepwise Regression statistic (both Forward and Backward) suggested that the metronome usage had a significantly negative impact on the student's MI level. However, the three MR analyses and the Partial Correlation analysis suggested that the student's metronome usage did not have a significantly **positive or negative** impact on MI. Of the study's 36 items, only two items--number of college courses in private lessons (positive) and participation in all-state jazz band (negative)--were identified by the seven statistical treatments as having an important impact on MI.

Should a researcher examine a study's data from a variety of perspectives? Although not reported earlier, the authors ran a variety of FA models before selecting and reporting the Iterated Principal Axis model. After examining and comparing a variety of FA models including the Iterated

Principal Axis-Varimax-SMC model, Principal Components, Kaiser Image Analysis, and Harris Image Analysis models, the authors selected the Iterated Principal Axis-Varimax-SMC model. Yet, a research paper or a journal article often will report findings that were developed using a single statistical treatment. Should an informed reviewer dismiss the findings and conclusions for this type of a report? If only one statistical treatment is to used, which one gives the most complete information when run alone? How important is the overlapping of independent variables?

The music education literature, and education literature in general, is being overwhelmed by "single agenda" research. Are researchers choosing the statistic that best supports their agenda or are they choosing the only statistic they know? If state music activities, practice activities, and college activities were critically re-examined (replication of this study that reflected similar findings) from a variety of perspectives, would they be allowed to continue in their present form? Should music education promote music activities that have a marginally important or negative impact on MI? Grades in a course, years in a course, years in a high school music activity, spending an adequate time practicing (time-on-task), or a variety of other music activities do not automatically translate into the development and mastery of MI.

D. A Hierarchy of Instrumental Performance

1. Musical Independence (MI) Hierarchy

Dealing with the many musical issues that interrelate in musical independence, Bobbett (1989) organized and identified the primary musical skills inherent in the development of MI. This hierarchy reflected levels of MI from the beginner to the advanced. The Hierarchy's five levels of MI included: (1) Think, (2) Listen, (3) Perform, (4) Conduct, and (5) Compose (see Figure 1). A hierarchy implies that these skills range from the basic to the most complex. The breadth of each skill is directly related to the breadth of the successive lower-level skills.

The concept of musical independence proposes that all musical skills fall into these five levels. Admittedly, the descriptors and their corresponding definitions are grossly simplified. The musical independence hierarchy illustrates that musicianship (horizontal axis) ranges from a typical high school music student (beginner) to a concertizing professional (advanced). The musical independence descriptors (left-vertical axis) illustrate the musician's auditory/cognitive/psycho-motor development. In applying the concept of a hierarchy to musical independence descriptors, knowing is a prerequisite to sensing; sensing is a prerequisite to making; making is a prerequisite to directing; and directing is a prerequisite to creating.

2. Performance Hierarchy

This study examined 276 future music educators/performers (freshman through graduate instrumentalists enrolled as music majors) who could be categorized as having intermediate to

moderately advanced musical independence. Using the study's data analysis, a Performance sub-Hierarchy was developed to explain the important aspects in developing instrumental MI.

A beginner instrumentalist is first taught to play a single tone, then a second tone, and later more tones. Seconds and thirds are learned at the beginning level, while the advanced instrumentalist practices larger intervals. As mentioned earlier, scales and thirds/arpeggios represent the basic fundamentals of western music. As the student becomes more advanced, exercises and etudes are taught. Later, after a certain level of mastery of the fundamental skills, students perform solos. A solo represents a variety of MI skills such as scales, seconds, thirds, large intervals plus other performance skills such as breath control, dynamics, articulation, phrasing, style and intonation--skills learned and mastered in "specialty" etudes. Finally, the instrumentalists coordinate their MI skills with other musicians by participating in instrumental ensembles.

3. Evaluation of practice activities using seven statistical procedures.

A variety of statistical procedures were used to evaluate the impact practicing activities such as scales (D2SC), thirds/arpeggios (D2TA), etudes (C2ET), and solos (D2SO) had on MI. The PPM data analysis suggested that although scales and thirds/arpeggios did not have a significant impact on MI, both practice activities had a positive impact (see Appendix C). The MR analysis (Appendix H, eight variables identified by Stepwise Regression-Backward) suggested that practicing solos (D2SO) had a significantly positive impact on MI and the Exploratory MR analysis confirmed that both solos and etudes had a positive impact on MI (see Appendix I). The FA model shed even more light on the organization and importance of the identified performance skills needed for developing MI. As illustrated in Appendix K, the primary component of Factor 3 was the student's emphasis on practicing solos (D2SO). Factor 6 illustrated that when students **emphasize** scales (D2SC= -.42), etudes (D2ET = -.33), and thirds/arpeggios (D2TA= -.20) during practicing, participate in instrumental ensemble (B2IE= -.24) classes and All-state Band (C4ASB= -.30), and earn higher grades in theory (B3TH= -.23), they **do not** practice band music (D2BM=.48), sight-reading (D2SR=.40), or improvisation (D2IM=.16), The FA model not only grouped these items into a single Factor, but explained the positive and negative relationships they have with each other.

*a. Practice activities with a **positive** impact on MI.*

Collectively, the four practice activities of scales, thirds/arpeggios, etudes (FA model), and solos (Ex.MR) have a positive impact on MI. Positive practicing skills can be organized sequentially. The mastery of scales and thirds/arpeggios are a prerequisite to the mastery of etudes and later solos. The mastery of etudes and solos are a prerequisite to playing in an instrumental ensemble. The study's data analysis (see Appendix L) suggests that both solos and etudes have a positive impact on the student MI development. These skills, often taught in private lessons, take many years to master. The process of

private lessons implies a "mentoring" process that describes a one-to-one relationship between the student and the teacher. The study's data analysis indicates that the number of semesters the student took **Private Lessons** (B2PL) has the largest positive impact on the student MI growth.

*b. Practice activities with a **negative** impact on MI.*

When other practice activities such as sight-reading, improvisation, and practicing band music are substituted for scales, thirds/arpeggios, etudes, and solos, the student's MI development is hindered. How often are students encouraged to participate these activities? Are students being encouraged to spend practice time on the wrong activities? How often has the band student been told to "go home and practice your band music?" The process of learning and development is different than the process of performance. Just as an athlete lifts weights, runs, and practices athletic drills to improve, the instrumentalist must rehearse essential fundamentals.

Perhaps students could play the band music better if they were instructed by their band director to "Go home and practice scales, thirds, arpeggios, and etudes. Then practice the band music." *Give a person a fish and you can feed them for a day, but teach them how to fish, and they can feed themselves for a life time.* Telling them to go practice band music is similar to giving a person a fish! The person might be fed for a day (or learn one piece of music), but tomorrow, when the student starts a new piece of music in band class, the director has to begin the cycle from the beginning--giving the student another fish. Taught from this perspective, students are **dependent** on the director, and never become truly musically **independent.** Rote teaching, with little emphasis on conceptual learning, is a primary example of this approach.

The authors suggest that the introduction of the Watkins Farnum Performance Scale (1962) may have had a large negative impact on American music education, as it popularized and promoted sight-reading as an important music skill. Today, **sight-reading** is often emphasized in music education. Students are encouraged to practice and develop sight-reading as an important component of their musical training. Sight-reading is often a large segment of all-state auditions and the chair placement process in high school and college bands.

Playing the correct notes during the first reading of a piece does reflect a portion of MI. Is sight-reading an essential MI skill? During a 100-yard race, does the runner's position after the first 5 yards become an accurate indication of how they will finish the race? Isn't the order of the finish the most important aspect of the race? Based on the study's analysis, sight-reading is of minor importance in developing and performing with a high level of MI. Skills relating to articulation, inner-rhythm, phrasing, tone, intonation, dynamics, style, balance, and musical technique are equally or more important. It is a misconception to think that playing in band or participation in all-state band is a sight-reading activity. During all-state band, students practice the music several days before it is performed. During a college

or high school band class, students may take several months to learn a new piece of music. The inclusion of sight-reading in auditions may occur because it provides an easy way to quantify an audition, as even a poor musician can usually count errors! If higher level skills are never taught to music educators, then sight-reading becomes the only basis for making musical (artistic?) evaluations.

Jazz is having an ever increasing impact on 20th century music education. In addition to jazz ensembles, the jazz idiom appears in high school and college ensembles such as pep-bands, marching bands, and concert bands. The study of jazz and improvisation is often begun as early as elementary school. At professional levels improvisation is a highly developed musical skill. At elementary levels, improvisation is often a type of pseudo-musicianship (be creative, feel it) rather than the end result of a well developed musical foundation.

Historically, improvisation has been a bench-mark of musical excellence. Both Bach and Mozart were respected for their abilities to improvise. There is a major difference between what Bach and Mozart did when they improvised, and the notion of improvisation often taught in today's schools. Bach and Mozart mastered fundamental MI skills before they participated in improvisation. Today, however, improvisation is part of most high school programs and virtually all college programs.

In a typical orchestral audition, no instrumentalist is required to sight-read or improvise. At the nations elite music conservatories, where most students later become professional instrumentalist, sight-reading and improvisation are not usually included as a portion of the curriculum. Should music education continue emphasizing sight-reading and improvisation as they are currently taught? *Goals 2000* emphasizes the inclusion of popular music and jazz its prescribed curriculum. Are these really the areas that should be emphasized rather than more basic and essential fundamentals?

4. <u>The importance of structure, sequence, and discipline.</u>

There are no short cuts to excellence. Musicianship requires dedication and hard work. **Structure** and **sequence** are essential aspects in the development of MI. Traditionally, the development of high levels of MI requires an equally high level of discipline, sensitivity, organization, preparation, and a keen ability to differentiate between subtleties. It is not unusual for an instrumentalist to spend many hours a day, over a period of months, refining one measure, one phrase, or one movement of a work. When improvisation, sight-reading, and practicing band music are elevated to a high status in the development of MI, many of the other essential performance skills associated with the development of MI are no longer emphasized. This study suggests that when students stress practicing band music and sight-reading, they ignore many of the important fundamentals that develop MI skills. The authors suggest that this practice time could be spent much more effectively on activities that have a significant positive effect on MI. Perhaps the same problem of misspent time associated with an emphasis on improvisation, could be remedied by first establishing a strong base of fundamentals. Although this data

does not indicate it, the authors suspect that improvisation is perhaps one of the highest levels of music performance, as the performer also serves as a composer. As a child must first crawl before it can walk, perhaps a more logically sequenced curriculum would better serve the student musician.

Historically, a **metronome** has been used to help teach discipline, inner-rhythm, and precision. The study's findings related to the usage of a metronome is somewhat puzzling. Historically, the usage of a metronome has always been an important component in the development of professional instrumentalists. It is constantly used by the world's top instrumental teachers at the elite music conservatories. The instrumentalist masters many important musical skills by using a metronome such as inner-rhythm, phrasing, the development of a musical line, discipline, and musical organization. Why would the study's data analysis suggest that the use of a metronome during practicing has a significantly negative impact on MI (see Appendix D and E)?

Is the primary mission of music education to develop higher level MI skills? Are high school and college bands "educational" or "recreational" activities? Is the development of higher level MI skills a primary mission for teaching band or participating in a band? Why doesn't the study's data analysis suggest that participation in most high school music activities enhances the student's MI development? Why does band music, improvisation, and sight-reading correlate negatively with MI? Why do so many music majors de-emphasize the practicing of scales, thirds, and arpeggios (Appendix B: 20% of their practicing)? Have these music majors mastered the essential fundamentals? Can they perform all major and minor scales, thirds, arpeggios (chords), etc. (i.e., sixteenth notes at MM=84), plus a half-dozen major works (solos) written for their respective instrument?

Structure, organization, sensitivity, and discipline regarding the mastery of fundamental skills of performance is a prerequisite to developing higher level performance MI skills such as etudes, solos, ensemble skills, and improvisation. If these music majors are able to perform (i.e., evenly, beautifully, dynamically consistency, etc.) scales, thirds, and arpeggios in all major and minor keys and at all tempos (sixteenth notes, where the quarter note MM = 72 - 96) and all etudes and solos reflecting perfect inner-rhythm, then maybe the use of a metronome is not an essential component in the development of higher level MI skills.

In summary, instrumental MI tacitly implies that the students needs to master a variety of MI skills as represented by the MI Hierarchy. Other than the subtest that evaluated "Instrument Recognition" (MAT3 ST4), the PC analysis (see Appendix J, non-shaded area) indicated that when students practiced scales, thirds/arpeggios, etudes, and solos, and participated in instrumental ensembles, they also learned many skills that are identifiable and measurable such as ***Tonal Memory*** (MAT3 ST1), ***Melody Recognition*** (MAT3 ST2), ***Pitch Recognition*** (MAT3 ST3), ***Composers*** (MAT4 ST1), ***Texture*** (MAT3 ST2), ***Audio-Visual Discrimination*** (MAT4 ST3), ***Chord Recognition*** (MAT4 ST4) and ***Cadence*** (MAT4 ST4). Each of these MI skills identified in the MAT3 and MAT4 subtests can

be learned by mastering scales, thirds/arpeggios, etudes, solos, and participating in an instrumental ensemble. Conversely, when the student practices sight-reading and improvisation, and participates in marching band, pep-band, or stage band, and performs in high school jazz band, all-state jazz band, and college jazz band, they neither acquire nor develop important high-level MI skills.

E. Current College Instructional Practices Might Need to be Re-examined

How is the typical instrumental student instructed in music education? Students take a variety of core classes, including private lessons, ear training, theory, keyboard/piano, music history, conducting, music education, voice/choir, instrumental ensemble, and general academics. What are the instructors' teaching strategies and what is expected of the student in these classes?

Private lessons usually consist of an expert on one instrument teaching a student how to play the instrument. Most lessons are for one hour and the student has one lesson per week. Although the student's grades in private lessons (PC, 6 of 9 subtests were negative) do not appear to be an important factor in the student's instrumental MI development, the number of courses in private lessons had a major impact on the student's development (see Appendix K and Appendix L). Realizing the importance of the number of private lessons, would it be possible for the student to take several lessons per week instead or for the lesson to last longer? If fulfilling certification requirements or the availability of obtaining a competent instrumental teacher becomes an issue, maybe more instrumental teachers should be hired by the college and college certification requirements should be changed.

Regarding the other music and music education classes, are the important musical skills and musical constructs really being mastered? As a point of discussion, would students master more MI skills and learn more if these skills were taught through first hand example? What if the students learned these skills and constraints on their instruments instead of passively absorbing information through a lecture and/or reading format? For example, in the theory class, instead of learning composition/theory in the conventional manner, allow the student to demonstrate the chord progression on their instrument. Admittedly, this strategy might require innovative teaching strategies, but currently, there is a very weak link between what is taught in the typical theory class (see Appendix J-Partial Correlation) and MI. Couldn't music history, ear training, and conducting also be taught in this manner?

F. Some other issues not examined in this study that might have an important impact on MI.

Originally, the ICS-2 was designed to examine the priorities of the student's high school band director. Several external reviewers suggested to the study's authors that this type of question would be invalid because the study's participant could not answer for another person. At best, this type of data should be considered "ghost" data because the participants would be describing their perceptions of what they believe their teacher thinks.

It obvious that the participants mastered many MI skills while they were under the influence of their high school band director. Further, the high school private teacher may have had a major role in the student's MI development (M≈3 years). Separating the influence and impact the private teacher from that of the high school band director would be a difficult process, especially because of the number of years between high school and college, and the further problem of separating perceptions from reality.

Motivation, dedication, drive, and discipline might also have a large impact on the student's MI development. If these issues do have a strong impact on MI development, who taught the student these skills or where did these skills come from: the high school administrator, church, private teacher, parent, band director, greater family values, school board, greater community, etc.? Where a typical college student does not study during vacations or the summer break, the music major should practice their instrument 7 days a week, 52 weeks a year.

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Authors Notes

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This study reflects a variety of expertise in many additional fields outside of "music education". The authors would like to extend their thanks the University of Tennessee-Knoxville's Statistics Department, and especially Dr. Esteban Walker and Dr. John Philpot for their statistical consultation throughout the organization and writing if this paper. In addition, the authors extend a special thanks to Dr. Charles "Chuck" M. Achilles at the University of North Carolina-Greensboro, Department of Educational Leadership, for his past and present suggestions regarding research design plus many editorial revisions. Simply, without the assistance of variety of experts, representing variety of specialities, and assisting in a variety of ways, this paper could not have been completed.

Additional research papers will be forthcoming from this study examining other postsecondary issues such as: (a) College Music Activities (What do good musicians emphasize during practicing, private lessons, and in the band class--scales, etudes, thirds, arpeggios, band music, sight-reading, solos, and improvisation), and (b) Musicianship (What do good musicians emphasize--tone, intonation, phrasing, technique, dynamics, rhythm, form, etc--to develop musicianship during practicing, band rehearsals, and private lessons?). After each of the five sections (see ISC-2, sections A-D) have been reported to educational conferences, additional projects will report comparisons between each of the five research areas (i.e., General Demographic vs. College Courses, or High School Music Activities vs. College Music Activities, etc.).

INSTRUMENTAL COLLEGE SURVEY-2

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A. General

Social Security Number_____ **Instrument** _____

1. Instrumental Organization _____
2. College rank: (Fr) (So) (Jr) (Sr) (Masters) (Doctoral)
3. College major: Music ( ), Non-music ( )
4. Total years you have played your band instrument (*grade school to present*): _____
5. What grade did you start band?_____

- Gender (M) (F)
- College GPA _____
- Age _____

B. College Course Work

1. How many hours a week do you:
   a. Practice Instrument _____
   b. Study non-music course work _____
2. Number of semester (quarter) classes you have completed in each area
3. Your average grade in each area (*A-B-C-D-F*)

Using the following scale for Questions 4-5,
***RATE** each activity as to its importance in:*

4. Developing musicianship
5. In your opinion, how would the music faculty **RATE** each area's importance?

Private (Inst.) Lessons	Ear training	Theory	Keyboard/Piano	Music History	Conducting	Music Education	Voice/Choir	Inst. Ensemble	General Academic
5 = **VERY** important, **4**=Important, **3**=Somewhat Important, **2**=Little Importance, **1**=**NOT** important									

6. The music course(s) that helped your musicianship the **most**? _____
   _____ **Least**? _____

C. High School Music Activities

1. High school GPA _____
2. ACT score _____ SAT score _____
3. Excellent high school musicians emphasize _____
4. How many **YEARS** did you participate in each of these high school activities?

Using the following scale for Questions 5-6,
***RATE** each activity as to its importance in developing **MUSICIANSHIP**:*

5. Your **Musical Development**
6. In your opinion, how would your high school **Band Director** rate each area's importance?

All-State Band	All-State Orchestra	All-State Jazz Band	All-State Choir	Concert Festival	Solo-Ensemble	Marching Contests	Private Lessons	Church/Community Choir	High School Jazz Band	Community Band
5 = Very important, **4** =Important, **3** =Somewhat Important, **2** =Little Importance, **1** = Not important										

OVER

D. College Music Activities

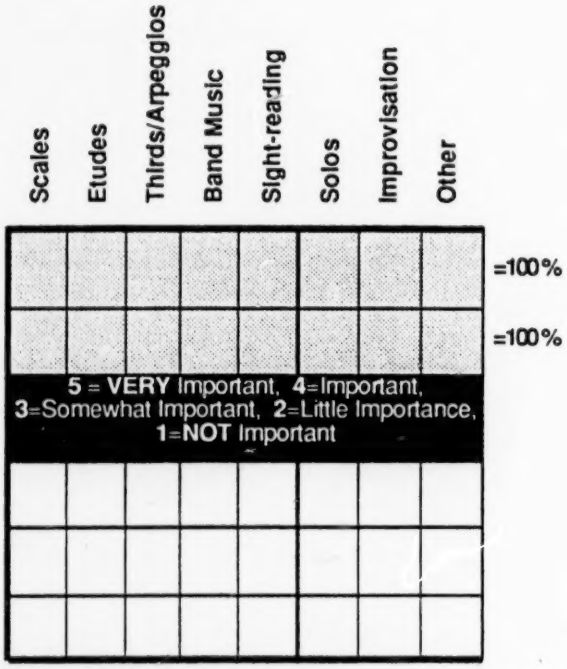
1. The percentage (%) of time you use a metronome during practicing?_____

Make sure Questions 2 and 3 each add up to 100%
What percentage (%) of time do you spend on the following activities during:

2. **Individual Practicing**
3. **Private Lessons** (*Major Inst.*)

Using the following scale for Questions 4-6, give YOUR PERCEPTION of how the following individuals would **RATE** each activity's importance in developing **MUSICIANSHIP**:

4. **Yourself**
5. Your private instrumental **Teacher**
6. Your college **Band Director**



7. Number of minutes per month you make a audio/video recording of your playing _____
8. Number of minutes per week you ask a **classmate/friend/faculty member** (*exclude private instrument teacher*) to listen/critique your instrument playing _____

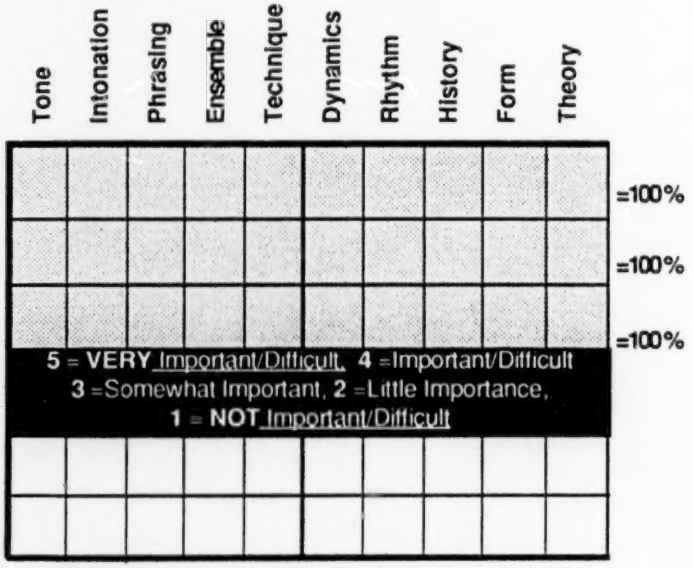
E. Musicianship

Make sure Questions 1, 2, and 3 each add up to 100%
What percentage (%) of time is spent practicing / thinking about these music items during:

1. **Individual Practicing?**
2. **Band Rehearsal?**
3. **Private Lessons ?**

*Using the following scale for Questions 4-5, **RATE** each activity in developing musicianship from the following perspectives:*

4. Its **Importance**
5. How **Difficult** is it to learn/master



6. When Performing, excellent instrumental musicians listen to/emphasize_____ while poor instrumental musicians listen to/emphasize _____

Descriptive Statistics

	Item	General: Number	General: Mean	General: Standard Deviation	General: Median	Range: Minimum	Range: Maximum	Range: Range	Normal Distribution: Kurtosis	Normal Distribution: Skewness	Normal Distribution: Shapiro-Wilk W test	Normal Distribution: Probability < W
	MAT3	*276*	*60.2*	*7.1*	*61*	*28*	*75*	*47*	*2.0*	*-1.0*	*.949*	*.000*
	MAT4	*276*	*72.1*	*9.1*	*74*	*31*	*88*	*57*	*2.1*	*-1.2*	*.910*	*.000*
	GT	*276*	*132.3*	*14.7*	*134*	*59*	*163*	*104*	*2.7*	*-1.2*	*.939*	*.000*
No. Col. Courses	1 B2 PL	270	4.7	4.1	3.5	0	32	32	9.2	2.3	.806	.000
	2 B2 ET	258	2.9	1.7	3.0	1	15	14	9.2	1.8	.819	.000
	3 B2 TH	261	3.4	2.4	3.0	1	18	17	8.9	2.2	.808	.000
	4 B2KB	239	2.5	1.5	2.0	1	10	9	2.4	1.3	.841	.000
	5 B2MH	132	2.6	2.1	3.0	1	12	11	4.6	2.0	.734	.000
	6 B2 CO	88	2.1	1.9	1.5	1	12	11	11.4	3.1	.607	.000
	7 B2 ME	145	3.5	6.2	2.0	1	70	69	88.6	8.7	.377	.000
	8 B2 VC	97	2.0	2.4	1.0	1	20	19	35.4	5.4	.457	.000
	9 B2 IE	262	6.6	8.4	4.0	1	70	69	21.4	4.0	.619	.000
	10 B2 GA	247	8.8	11.4	5.0	1	72	71	11.3	3.2	.611	.000
Grades in Col. Courses	11 B3 PL	266	3.8	0.5	4.0	1	4	5	6.5	-1.7	.587	.000
	12 B3 ET	253	3.2	0.8	3.0	1	4	3	-0.5	-0.7	.786	.000
	13 B3 TH	254	3.3	0.8	3.0	1	4	3	0.2	-1.0	.755	.000
	14 B3 KB	235	3.6	0.7	4.0	1	4	3	3.2	-1.8	.608	.000
	15 B3 MH	134	3.2	0.9	4.0	1	4	3	-0.2	-0.8	.787	.000
	16 B3 CO	87	3.8	0.5	3.0	2	4	3	2.0	-1.4	.592	.000
	17 B3 ME	139	3.7	0.5	4.0	2	4	2	1.7	-1.6	.565	.000
	18 B3 VC	97	3.9	0.4	4.0	2	4	3	5.6	-2.1	.496	.000
	19 B3 IE	258	4.0	0.1	4.0	3	4	1	46.6	-7.0	.131	.000
	20 B3 GA	245	3.2	0.7	4.0	1	4	4	-0.2	-0.1	.814	.000
HS Music Acitivities	21 C4 ASB	274	1.0	1.2	0.0	0	5	5	0.7	1.2	.749	.000
	22 C4 ASO	274	0.3	0.8	0.0	0	5	5	15.0	3.7	.419	.000
	23 C4 ASJB	274	0.1	0.4	0.0	0	4	4	34.5	5.5	.261	.000
	24 C4 ASC	274	0.1	0.4	4.0	0	4	4	45.1	6.3	.230	.000
	25 C4 CF	274	2.9	1.9	4.0	0	8	8	-0.9	-0.3	.826	.000
	26 C4 SE	275	3.6	1.6	4.0	0	8	8	0.5	-0.3	.885	.000
	27 C4 MC	274	3.1	1.8	3.0	0	14	14	4.1	0.1	.799	.000
	28 C4 PL	274	2.8	2.3	0.0	0	16	16	4.0	1.2	.869	.000
	29 C4 CCC	275	1.2	2.0	2.0	0	14	14	7.2	2.2	.669	.000
	30 C4 HSJB	274	1.8	1.6	0.0	0	6	6	-1.4	0.2	.822	.000
	31 C4 CB	275	1.0	1.4	0.0	0	5	5	0.5	1.3	.731	.000
Practice Activities	32 D2 SC	271	12.9	8.0	10.0	0	40	40	0.7	1.0	.870	.000
	33 C2 ET	271	20.8	14.7	20.0	0	75	75	1.4	1.1	.907	.000
	34 D2 TA	270	7.3	6.0	5.0	0	45	45	6.0	1.7	.851	.000
	35 D2 BM	270	8.4	8.6	5.0	0	50	50	3.2	1.6	.825	.000
	36 D2 SR	270	7.3	7.0	5.0	0	50	50	6.8	2.0	.815	.000
	37 D2 SO	271	33.0	18.1	30.0	0	85	85	0.0	0.5	.949	.000
	38 D2 IM	270	3.7	7.9	0.0	0	50	50	10.9	3.1	.539	.000
	39 D2 OT	265	6.9	11.6	1.0	0	80	80	10.4	2.8	.650	.000
Other Act.	40 D1 Metronome	272	32.3	27.7	25.0	0	100	100	-0.5	0.7	.880	.000
	41 B1a. Practice	273	11.4	5.7	10.0	0	30	30	0.0	0.6	.954	.000
	42 B1b. Study	260	6.3	4.9	5.0	0	28	28	2.8	1.4	.882	.000
	43 A7. Col. GPA	252	3.3	0.5	3.3	1	4	3	1.2	-0.9	.929	.000
	44 A4. Yrs/ Inst	274	9.4	3.0	9.0	1	22	21	2.0	0.7	.953	.000
	45 D7. MIN/audio	259	25.6	85.2	0.0	0	1000	1000	73.3	7.7	.337	.000
	46 D8. MIN/person	259	24.2	40.0	0.0	0	300	300	14.1	3.3	.635	.000

Pearson Product Moment Correlation

Musical Independence (Outcome) | Number of College Classes | Grades in Col. Classes

		MAT3	MAT4	GT	B2 PL	B2 ET	B2 TH	B2KB	B2MH	B2 CO	B2 ME	B2 VC	B2 IE	B2 GA	B3 PL	B3 ET	B3 TH	B3 KB	B3 MH	B3 CO	B3 ME	B3 VC	B3 IE	B3 GA
					1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
	MAT3	1.00	.88	.97	.42	.03	.13	.18	.23	-.07	-.03	.04	.37	.12	-.01	.19	.11	-.10	-.02	-.26	-.17	.14	.13	-.10
	MAT4	.88	1.00	.97	.39	.00	.10	.22	.29	.01	.07	.09	.32	.31	-.15	.08	-.02	-.30	.09	-.20	-.25	.11	.00	-.13
	GT	.97	.97	1.00	.41	.01	.11	.21	.27	-.03	.02	.07	.36	.23	-.09	.13	.04	-.21	.04	-.24	-.22	.13	.06	-.12
1	B2 PL	.42	.39	.41	1.00	-.01	.31	.30	.43	-.10	.00	.10	.72	.23	-.36	.16	.25	-.15	.03	.11	.08	.18	-.15	-.14
2	B2 ET	.03	.00	.01	-.01	1.00	.89	.37	.49	.38	.42	.31	.06	.44	.10	-.20	.07	.06	.34	.25	.17	-.06	.05	.07
3	B2 TH	.13	.10	.11	.31	.89	1.00	.41	.57	.24	.40	.40	.25	.39	-.10	-.17	.26	-.03	.35	.36	.34	.04	.10	.15
4	B2KB	.18	.22	.21	.30	.37	.41	1.00	.34	.13	.08	.65	.43	.44	-.37	.37	.12	-.13	.48	.27	.25	-.06	-.07	.26
5	B2MH	.23	.29	.27	.43	.49	.57	.34	1.00	.50	.59	.04	.46	.57	.15	.03	.24	-.32	.28	.15	.07	.01	.13	.01
6	B2 CO	-.07	.01	-.03	-.10	.38	.24	.13	.50	1.00	.87	-.03	.05	.53	.06	-.19	-.24	-.24	.17	.28	-.23	-.11	-.02	-.04
7	B2 ME	-.03	.07	.02	.00	.42	.40	.08	.59	.87	1.00	-.03	.11	.48	.03	-.27	-.16	-.23	.20	.42	.00	.07	.09	-.12
8	B2 VC	.04	.09	.07	.10	.31	.40	.65	.04	-.03	-.03	1.00	.04	.04	-.50	.17	.11	-.02	.41	.31	.29	.19	.10	.47
9	B2 IE	.37	.32	.36	.72	.06	.25	.43	.46	.05	.11	.04	1.00	.43	-.06	.29	.01	-.30	-.11	.08	-.07	.16	.01	-.10
10	B2 GA	.12	.31	.23	.23	.44	.39	.44	.57	.53	.48	.04	.43	1.00	-.08	.10	-.04	-.15	.20	.24	-.31	-.12	-.15	-.07
11	B3 PL	-.01	-.15	-.09	-.36	.10	-.10	-.37	.15	.06	.03	-.50	-.06	-.08	1.00	.02	.04	.02	-.17	-.27	-.08	-.16	.55	-.06
12	B3 ET	.19	.08	.13	.16	-.20	-.17	.37	.03	-.19	-.27	.17	.29	.10	.02	1.00	.57	.19	.18	-.18	.04	-.18	.26	.09
13	B3 TH	.11	-.02	.04	.25	.07	.26	.12	.24	-.24	-.16	.11	.01	-.04	.04	.57	1.00	.09	.41	.07	.41	-.15	.26	.35
14	B3 KB	-.10	-.30	-.21	-.15	.06	-.03	-.13	-.32	-.24	-.23	-.02	-.30	-.15	.02	.19	.09	1.00	.03	-.13	.12	-.02	.11	-.03
15	B3 MH	-.02	.09	.04	.03	.34	.35	.48	.28	.17	.20	.41	-.11	.20	-.17	.18	.41	.03	1.00	.49	.65	-.12	-.01	.43
16	B3 CO	-.26	-.20	-.24	.11	.25	.36	.27	.15	.28	.42	.31	.08	.24	-.27	-.18	.07	-.13	.49	1.00	.51	.41	-.15	.36
17	B3 ME	-.17	-.25	-.22	.08	.17	.34	.25	.07	-.23	.00	.29	-.07	-.31	-.08	.04	.41	.12	.65	.51	1.00	.10	.20	.39
18	B3 VC	.14	.11	.13	.18	-.06	.04	-.06	.01	-.11	.07	.19	.16	-.12	-.16	-.18	-.15	-.02	-.12	.41	.10	1.00	-.09	-.06
19	B3 IE	.13	.00	.06	-.15	.05	.10	-.07	.13	-.02	.09	.10	.01	-.15	.55	.26	.26	.11	-.01	-.15	.20	-.09	1.00	.34
20	B3 GA	-.10	-.13	-.12	-.14	.07	.15	.26	.01	-.04	-.12	.47	-.10	-.07	-.06	.09	.35	-.03	.43	.36	.39	-.06	.34	1.00
21	C4 ASB	-.23	-.20	-.22	.03	-.15	-.11	.40	-.05	-.04	-.07	.62	-.05	-.09	-.34	.51	.24	.20	.27	.14	.15	.09	.14	.33
22	C4 ASO	-.37	-.31	-.35	.06	-.09	-.05	.39	-.13	-.16	-.22	.71	-.05	-.16	-.36	.38	.16	.09	.22	.12	.18	.09	.08	.29
23	C4 ASJB	-.76	-.81	-.81	-.22	-.07	-.12	-.16	-.16	-.04	-.03	.03	-.16	-.17	.10	.23	.21	.23	-.05	.18	.12	.11	.05	.04
24	C4 ASC	-.31	-.19	-.25	.07	-.01	.06	.60	.04	.05	-.02	.81	.06	.03	-.44	.32	.08	-.11	.30	.23	.18	.04	.07	.38
25	C4 CF	.19	.30	.26	-.10	-.03	.02	.28	-.05	.14	.20	.42	-.13	.06	-.35	-.11	-.20	.02	.36	.33	.18	.29	-.09	.23
26	C4 SE	-.09	-.11	-.10	-.02	.12	.14	.33	-.07	.16	.04	.40	-.33	.11	-.30	.04	.14	.27	.40	.33	.24	-.17	-.03	.39
27	C4 MC	-.23	-.27	-.26	-.27	-.21	-.29	-.58	-.54	-.35	-.36	-.43	-.11	-.30	.31	-.19	-.26	.01	-.37	-.02	-.11	.09	-.15	-.27
28	C4 PL	-.01	-.07	-.04	.01	.05	.09	.48	-.18	.05	-.05	.72	-.10	-.12	-.33	.12	-.06	.13	.25	.18	.22	-.17	.19	.46
29	C4 CCC	-.37	-.30	-.34	.14	-.07	-.05	.42	-.13	-.17	-.28	.51	.06	.01	-.34	.42	.21	.08	.31	.08	.12	-.17	-.11	.25
30	C4 HSJB	-.45	-.34	-.40	-.04	-.16	-.20	-.39	.19	.27	.20	-.31	-.28	-.01	.12	-.44	-.11	-.07	.06	.11	-.06	.02	-.26	-.05
31	C4 CB	-.17	-.13	-.15	-.14	.14	-.02	.05	.10	.32	.21	-.17	.13	.32	.18	.21	-.03	.01	.27	-.10	-.11	-.33	-.08	-.06
32	D2 SC	.21	.07	.14	.34	.05	.17	.29	.65	.22	.27	-.09	.57	.22	.20	.26	.31	-.14	.07	-.07	.14	.00	.28	.15
33	D2 ET	.20	.25	.24	.08	-.17	.05	-.10	.38	.26	.44	-.02	.20	.01	.02	.05	.27	-.53	.13	.22	.16	.23	.24	.23
34	D2 TA	.05	-.03	.01	.47	.28	.42	.30	.32	-.06	-.04	.15	.61	.27	.17	.10	.23	-.09	-.04	.11	.02	.00	.26	.28
35	D2 BM	-.03	.04	.01	-.32	.10	-.01	-.01	-.29	-.12	-.18	-.02	-.30	-.10	.05	-.06	-.17	.13	.04	-.17	-.04	.03	-.01	-.10
36	D2 SR	-.38	-.26	-.32	-.35	-.02	-.20	.06	-.25	.04	-.07	-.04	-.25	.09	-.27	.09	-.10	.04	.21	.20	-.09	-.03	-.65	-.05
37	D2 SO	.09	.12	.11	.10	.11	.07	.02	-.06	-.13	-.18	.19	-.23	-.10	-.29	-.16	-.13	.16	.07	-.08	.11	-.11	-.23	-.14
38	D2 IM	-.15	-.11	-.13	-.21	-.23	-.31	-.37	-.27	-.10	-.12	-.13	-.05	.06	.21	-.26	-.38	.14	-.50	-.12	-.52	.18	.12	.04
39	D2 OT	.17	-.05	.05	.01	-.13	-.16	-.03	-.25	.10	.04	-.27	.00	-.13	.27	.10	.04	.16	-.16	-.08	-.10	-.13	.15	-.16
40	D1 Metronome	-.41	-.39	-.41	.14	-.08	-.01	.08	.23	-.12	-.13	.19	-.14	-.13	-.10	.05	.26	-.04	.14	.06	.26	-.01	-.09	.08
41	B1a. Practice	-.15	-.20	-.18	.09	-.06	.03	.52	-.03	-.30	-.35	.42	.16	.02	-.17	.26	.20	.00	.18	.06	.34	-.25	.20	.52
42	B1b. Study	-.48	-.51	-.51	.61	.21	.06	-.19	-.44	-.05	-.04	-.06	-.53	-.09	.09	-.07	.03	.51	.17	.20	.18	-.23	.05	.27
43	A7. Col. GPA	-.01	-.13	-.08	.28	.29	.50	.34	.37	-.07	.08	.48	.18	-.03	-.05	.23	.65	.03	.51	.56	.68	.38	.29	.58
44	A4. Yrs/ Inst	.14	.14	.15	.74	.14	.39	.38	.35	-.04	.03	.25	.55	.38	-.30	.09	.06	.12	-.09	.05	-.02	.01	-.01	-.12
45	D7. MIN/audio	.12	.19	.16	.19	.01	.16	.65	-.02	-.10	-.13	.88	.13	.11	-.52	.26	.04	-.03	.30	.26	.20	.12	.09	.41
46	D8. MIN/person	.18	.19	.19	-.19	.64	.57	.37	.03	.03	.14	.55	-.10	.36	-.11	-.02	.01	.27	.34	.31	.18	.12	.14	.21

No. Col. Courses | Grades in Col. Courses | HS Music Activities | Practice Activities | Other Activities

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Pearson Product Moment Correlation

Second Page of Appendix C

	High School Music Activities											Col. Inst. Practice Activities								Miscel. Music Indicators						
	1	2	3	4	5	6	7	8	9	10	11	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7
	C4 ASB	C4 ASO	C4 ASJB	C4 ASC	C4 CF	C4 SE	C4 MC	C4 PL	C4 CCC	C4 HSJB	C4 CB	D2 SC	D2 ET	D2 TA	D2 BM	D2 SR	D2 SO	D2 IM	D2 OT	D1 Metronome	B1a. MIN/Practice	B1b. MIN/Study	A7. Col. GPA	A4. Yrs /Inst.	D7. MIN/Audio	D8Min/Another Per.
	-.23	-.37	-.76	-.31	.19	-.09	-.23	-.01	-.37	-.45	-.17	.21	.20	.05	-.03	-.38	.09	-.15	.17	-.41	-.15	-.48	-.01	.14	.12	.18
	-.20	-.31	-.81	-.19	.30	-.11	-.27	-.07	-.30	-.34	-.13	.07	.25	-.03	.04	-.26	.12	-.11	-.05	-.39	-.20	-.51	-.13	.14	.19	.19
	-.22	-.35	-.81	-.25	.26	-.10	-.26	-.04	-.34	-.40	-.15	.14	.24	.01	.01	-.32	.11	-.13	.05	-.41	-.18	-.51	-.08	.15	.16	.19
	.03	.06	-.22	.07	-.10	-.02	-.27	.01	.14	-.04	-.14	.34	.08	.47	-.32	-.35	.10	-.21	.01	.14	.09	-.61	.28	.74	.19	-.19
	-.15	-.09	-.07	-.01	-.03	.12	-.21	.05	-.07	-.16	.14	.05	-.17	.28	.10	-.02	.11	-.23	-.13	-.08	-.06	.21	.29	.14	.01	.64
	-.11	-.05	-.12	.06	.02	.14	-.29	.09	-.05	-.20	-.02	.17	.05	.42	-.01	-.20	.07	-.31	-.16	-.01	.03	.06	.50	.39	.16	.57
	.40	.39	-.16	.60	.28	.33	-.58	.48	.42	-.39	.05	.29	-.10	.30	-.01	.06	.02	-.37	-.03	.08	.52	-.19	.34	.38	.65	.37
	-.05	-.13	-.16	.04	-.05	-.07	-.54	-.18	-.13	.19	.10	.65	.38	.32	-.29	-.25	-.06	-.27	-.25	.23	-.03	-.44	.37	.35	-.02	.03
	-.04	-.16	-.04	.05	.14	.16	-.35	.05	-.17	.27	.32	.22	.26	-.06	-.12	.04	-.13	-.10	.10	-.12	-.30	-.05	-.07	-.04	-.10	.03
	-.07	-.22	-.03	-.02	.20	.04	-.36	-.05	-.28	.20	.21	.27	.44	-.04	-.18	-.07	-.18	-.12	.04	-.13	-.35	-.04	.08	.03	-.13	.14
	.62	.71	.03	.81	.42	.40	-.43	.72	.51	-.31	-.17	-.09	-.02	.15	-.02	-.04	.19	-.13	-.27	.19	.42	-.06	.48	.25	.88	.55
	-.05	-.05	-.16	.06	-.13	-.33	-.11	-.10	.06	-.28	.13	.57	.20	.61	-.30	-.25	-.23	-.05	.00	-.14	.16	-.53	.18	.55	.13	-.10
	-.09	-.16	-.17	.03	.06	.11	-.30	-.12	.01	-.01	.32	.22	.01	.27	-.10	.09	-.10	.06	-.13	-.13	.02	-.09	-.03	.38	.11	.36
	-.34	-.36	.10	-.44	-.35	-.30	.31	-.33	-.34	.12	.18	.20	.02	.17	.05	-.27	-.29	.21	.27	-.10	-.17	.09	-.05	-.30	-.52	-.11
	.51	.38	.23	.32	-.11	.04	-.19	.12	.42	-.44	.21	.26	.05	.10	-.06	.09	-.16	-.26	.10	.05	.26	-.07	.23	.09	.26	-.02
	.24	.16	.21	.08	-.20	.14	-.26	-.06	.21	-.11	-.03	.31	.27	.23	-.17	-.10	-.13	-.38	.04	.26	.20	.03	.65	.06	.04	.01
	.20	.09	.23	-.11	.02	.27	.01	.13	.08	-.07	.01	-.14	-.53	-.09	.13	.04	.16	.14	.16	-.04	.00	.51	.03	.12	-.03	.27
	.27	.22	-.05	.30	.36	.40	-.37	.25	.31	.06	.27	.07	.13	-.04	.04	.21	.07	-.50	-.16	.14	.18	.17	.51	-.09	.30	.34
	.14	.12	.18	.23	.33	.33	-.02	.18	.08	.11	-.10	-.07	.22	.11	-.17	.20	-.08	-.12	-.08	.06	.06	.20	.56	.05	.26	.31
	.15	.18	.12	.18	.18	.24	-.11	.22	.12	-.06	-.11	.14	.16	.02	-.04	-.09	.11	-.52	-.10	.26	.34	.18	.68	-.02	.20	.18
	.09	.09	.11	.04	.29	-.17	.09	-.17	-.17	.02	-.53	.00	.23	.00	.03	-.03	-.11	.18	-.13	-.01	-.25	-.23	.38	.01	.12	.12
	.14	.08	.05	.07	-.09	-.03	-.15	.19	-.11	-.26	-.08	.28	.24	.26	-.01	-.65	-.23	.12	.15	-.09	.20	.05	.29	-.01	.09	.14
	.33	.29	.04	.38	.23	.39	-.27	.46	.25	-.05	-.06	.15	.23	.28	-.10	-.05	-.14	.04	-.16	.08	.52	.27	.58	-.12	.41	.21
	1.00	.90	.51	.85	.33	.38	-.49	.60	.78	-.05	.07	.03	.00	-.06	-.08	.16	-.04	-.08	-.07	.37	.31	-.04	.34	.20	.58	.07
	.90	1.00	.56	.92	.17	.31	-.32	.62	.88	.03	.03	-.09	-.16	.08	-.06	.12	.06	-.02	-.17	.53	.44	-.07	.32	.23	.65	.05
	.51	.56	1.00	.38	-.23	-.02	.14	-.02	.53	.29	.20	.00	-.06	.09	-.02	.32	-.35	.15	.02	.41	.05	.31	.26	-.06	-.11	-.17
	.85	.92	.38	1.00	.26	.35	-.48	.68	.78	-.03	.00	.04	-.03	.12	-.13	.07	.05	-.07	-.23	.47	.53	-.15	.34	.26	.77	.12
	.33	.17	-.23	.26	1.00	.56	-.33	.47	.13	-.02	.05	-.14	.27	-.44	.32	.14	-.03	-.21	.09	-.11	-.03	-.03	.09	.06	.51	.36
	.38	.31	-.02	.35	.56	1.00	-.39	.70	.33	.13	-.01	-.22	-.20	-.21	.17	.03	.22	-.28	.27	.26	.31	.17	.19	.29	.52	.30
	-.49	-.32	.14	-.48	-.33	-.39	1.00	-.42	-.27	-.05	.00	-.52	-.18	-.06	.21	.25	-.08	.30	.02	-.29	-.33	.34	-.31	-.34	-.40	-.10
	.60	.62	-.02	.68	.47	.70	-.42	1.00	.53	-.15	.04	-.14	-.20	.01	-.07	-.14	.22	-.10	.17	.20	.52	.00	.16	.29	.77	.30
	.78	.88	.53	.78	.13	.33	-.27	.53	1.00	.10	.38	-.06	-.24	.16	-.02	.28	-.05	-.07	-.04	.47	.46	-.01	.18	.27	.49	-.02
	-.05	.03	.29	-.03	-.02	.13	-.05	-.15	.10	1.00	.16	.10	.04	-.09	-.20	.09	-.03	.21	-.05	.60	-.08	-.11	-.05	-.05	-.28	-.43
	.07	.03	.20	.00	.05	-.01	.00	.04	.38	.16	1.00	.13	.01	.01	-.01	.34	-.26	-.09	.13	-.07	-.02	.18	-.28	-.08	-.18	-.02
	.03	-.09	.00	.04	-.14	-.22	-.52	-.14	-.06	.10	.13	1.00	.43	.43	-.40	-.36	-.35	-.12	.04	.20	.31	-.42	.39	.22	-.07	-.25
	.00	-.16	-.06	-.03	.27	-.20	-.18	-.20	-.24	.04	.01	.43	1.00	-.07	-.15	-.12	-.45	-.18	-.10	-.10	-.20	-.27	.35	-.19	-.03	-.16
	-.06	.08	.09	.12	-.44	-.21	-.06	.01	.16	-.09	.01	.43	-.07	1.00	-.27	-.34	-.37	.33	.09	.02	.35	-.07	.40	.41	.10	.03
	-.08	-.06	-.02	-.13	.32	.17	.21	-.07	-.02	-.20	-.01	-.40	-.15	-.27	1.00	.26	-.25	-.18	.20	-.33	-.27	.33	-.22	-.21	-.08	.14
	.16	.12	.32	.07	.14	.03	.25	-.14	.28	.09	.34	-.36	-.12	-.34	.26	1.00	-.14	-.07	-.17	-.03	-.22	.46	-.19	-.41	-.12	.00
	-.04	.06	-.35	.05	-.03	.22	-.08	.22	-.05	-.03	-.26	-.35	-.45	-.37	-.25	-.14	1.00	-.26	-.41	.25	.12	-.18	-.15	.17	.20	.17
	-.08	-.02	.15	-.07	-.21	-.28	.30	-.10	-.07	.21	-.09	-.12	-.18	.33	-.18	-.07	-.26	1.00	-.03	-.09	.02	.18	-.25	-.04	-.06	.03
	-.07	-.17	.02	-.23	.09	.27	.02	.17	-.04	-.05	.13	.04	-.10	.09	.20	-.17	-.41	-.03	1.00	-.26	-.11	.06	-.14	.06	-.15	-.15
	.37	.53	.41	.47	-.11	.26	-.29	.20	.47	.60	-.07	.20	-.10	.02	-.33	-.03	.25	-.09	-.26	1.00	.47	-.27	.29	.21	.22	-.25
	.31	.44	.05	.53	-.03	.31	-.33	.52	.46	-.08	-.02	.31	-.20	.35	-.27	-.22	.12	.02	-.11	.47	1.00	-.06	.29	.26	.55	.10
	-.04	-.07	.31	-.15	-.03	.17	.34	.00	-.01	-.11	.18	-.42	-.27	-.07	.33	.46	-.18	.18	.06	-.27	-.06	1.00	-.03	-.40	-.18	.32
	.34	.32	.26	.34	.09	.19	-.31	.16	.18	-.05	-.28	.39	.35	.40	-.22	-.19	-.15	-.25	-.14	.29	.29	-.03	1.00	.16	.33	.25
	.20	.23	-.06	.26	.06	.29	-.34	.29	.27	-.05	-.08	.22	-.19	.41	-.21	-.41	.17	-.04	.06	.21	.26	-.40	.16	1.00	.41	.12
	.58	.65	-.11	.77	.51	.52	-.40	.77	.49	-.28	-.18	-.07	-.03	.10	-.08	-.12	.20	-.06	-.15	.22	.55	-.18	.33	.41	1.00	.44
	.07	.05	-.17	.12	.36	.30	-.10	.30	-.02	-.43	-.02	-.25	-.16	.03	.14	.00	.17	.03	-.15	-.25	.10	.32	.25	.12	.44	1.00

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Stepwise Regression
Forward
p≤.05

Items B2 KB, B2MH, B2CO, B2ME, B2VC, B3MH, B3MH, B3CO, B3VC, B3VC were eliminated from further study because the "n's" were considerably smaller than the total music major sample of n=276.

Durbin Watson

	Variable	Coefficient	Std. Error	F-to-Remove
	Intercept	93.62	6.181	229.419
1	B2PL	0.87	0.21	16.35
2	B3ET	6.25	1.14	29.82
3	C4ASJB	-6.30	1.99	10.02
4	D1 Metronome	-0.07	0.03	4.16
5	A7 Col. GPA	5.79	2.16	7.21

Regression Summary

Number	167
Num. Missing	109
R	.62
R^2	.38
Adjusted R^2	36.3%

#>=0	#>0	Durbin-Watson
94	73	0.74

Variables not in Equation

	Variable	Par. Corr:	F to Enter	Rank
1	B2 ET	0.02	0.09	
2	B2 TH	-0.02	0.05	
3	B2 IE	-0.03	0.13	
4	B2 GA	0.02	0.04	
5	B3 PL	-0.05	0.34	
6	B3 TH	0.10	1.63	6
7	B3 IE	0.03	0.19	
8	B3 GA	0.00	0.00	
9	C4 ASB	0.08	1.12	
10	C4 ASO	-0.13	2.56	2
11	C4 ASC	-0.04	0.25	
12	C4 CF	0.02	0.04	
13	C4 SE	0.08	1.12	
14	C4 MC	0.02	0.07	
15	C4 PL	0.11	1.78	5
16	C4 CCC	-0.09	1.32	
17	C4 HSJB	0.12	2.13	3
18	C4 CB	0.05	0.38	
19	D2 SC	-0.06	0.95	
20	D2 ET	0.05	0.37	
21	D2 TA	-0.01	0.01	
22	D2 BM	-0.06	0.57	
23	D2 SR	0.06	0.61	
24	D2 SO	0.11	1.99	4
25	D2 IM	0.05	0.34	
26	D2 OT	-0.15	3.87	1
27	B1a. Practice	-0.03	0.15	
28	B1b. Study	-0.04	0.22	
29	A4. Yrs/ Inst	-0.09	1.38	

Items that have some impact on MI (student outcome as measured by the study's GT score), but not a significant impact at p≤.05.

Stepwise Regression

Backward

p≤.05

Items B2 KB, B2MH, B2CO, B2ME, B2VC, B3MH, B3MH, B3CO, B3VC, B3VC were eliminated from further study because the "n's" were considerably smaller than the total music major sample of n=276.

	Coefficient	Std. Coeff.	F-to-Remove
Intercept	98.71	98.71	595.84
B2 PL	1.03	0.32	23.90
B3 ET	5.68	0.35	21.50
B3 TH	3.20	0.20	7.11
C4 ASO	-2.32	-0.15	4.95
C4 ASJB	-3.93	-0.13	3.79
C4 PL	0.84	0.13	3.98
D2 SO	0.09	0.12	3.47
D1 Metronome	-0.08	-0.15	5.41

Regression Summary

Number	167
Num. Missing	109
R	.65
R^2	.42
Adjusted R^2	39.0%

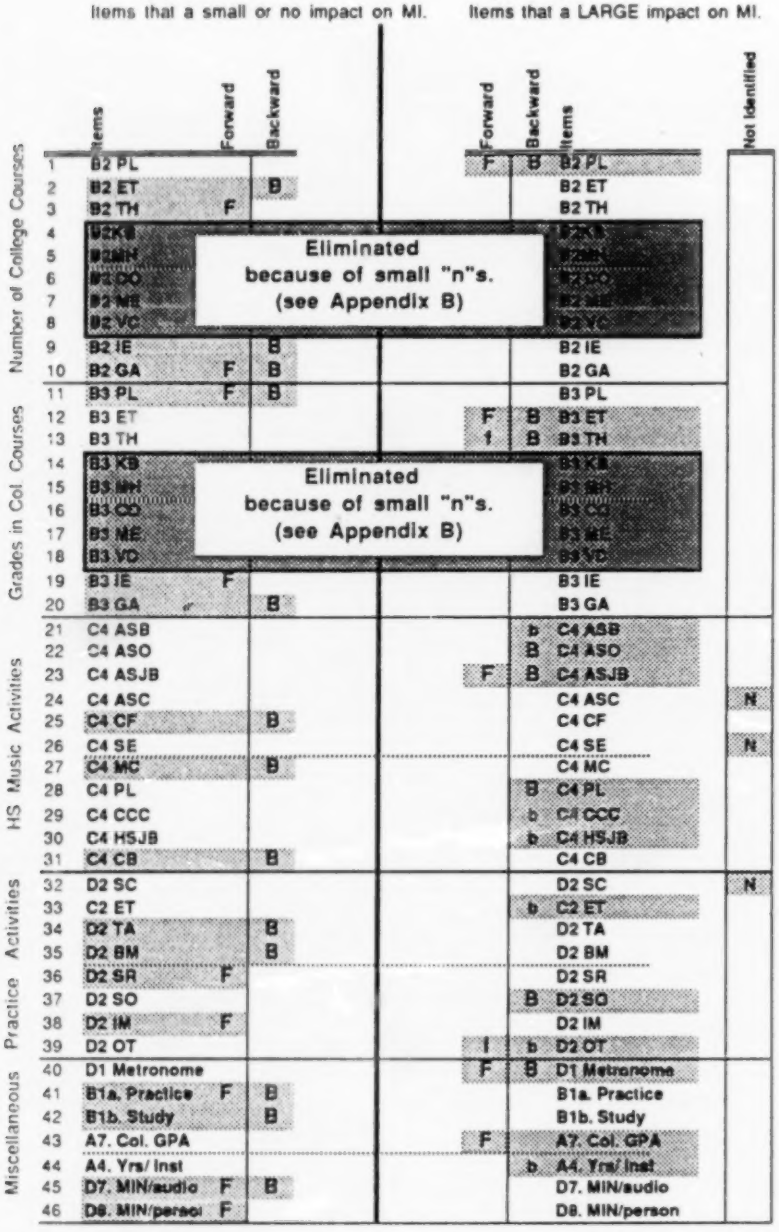
Variables not in Equation

	Variable	Partial Cor.	F-to-Enter	Rank
1	B2 ET	0.01	0.03	
2	B2 TH	-0.04	0.21	
3	B2 IE	0.01	0.01	
4	B2 GA	0.00	0.00	
5	B3 PL	-0.02	0.05	
6	B3 IE	0.05	0.37	
7	B3 GA	0.03	0.17	
8	C4 ASB	0.10	1.65	5
9	C4 ASC	-0.03	0.14	
10	C4 CF	0.02	0.07	
11	C4 SE	0.04	0.26	
12	C4 MC	0.02	0.05	
13	C4 CCC	-0.11	1.85	4
14	C4 HSJB	0.09	1.36	6
15	C4 CB	0.03	0.12	
16	D2 SC	-0.07	0.66	
17	D2 ET	0.14	3.04	1
18	D2 TA	0.00	0.00	
19	D2 BM	-0.01	0.02	
20	D2 SR	0.07	0.77	
21	D2 IM	0.06	0.53	
22	D2 OT	-0.12	2.27	2
23	B1a. Practice	0.00	0.00	
24	B1b. Study	0.01	0.01	
25	A7. Col. GPA	0.08	0.91	
26	A4. Yrs/ Inst	-0.11	1.90	3
27	D7. MIN/audio	-0.03	0.17	
28	D8. MIN/person	0.04	0.26	

Items that have some impact on MI (student outcome as measured by the study's GT score), but not a significant impact at p≤.05.

Stepwise Regression *

Summary of both Forward and Backward Stepwise Regression (ps.05)



Summary

15 Items = Important
18 items= Unimportant
3 Items = Not identified either as important on nonimortant
10 Items = Excluded because of small "n".

* **Dark shaded** area=items eliminated because of a small "n"; **Shaded area**=significant at .05, or questionably important (ps.05 to .10). **F**=Stepwise Reg. (*Forward*); **B**=Stepwise Reg. (*Backward*); Capital Letters (i.e., **F** or **B**) = ps.05. Small letters (f or b) =questionable importance.

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Multiple Regression

5 Independent Variables
(Identified by Stepwise Regression (Forward), p≤.05)

Number	R	R^2	Adjusted R^2	RMS Residual:
231	.54	.29	**27.7%**	12.733

Analysis of Variance Table

Source	DF:	Sum Squares:	Mean Square:	F-test:
REGRESSION	5	15070.98	3014.20	18.59
RESIDUAL	225	36476.59	162.12	**p = .0001**
TOTAL	230	51547.57		

Residual Information Table

SS[e(i)-e(i-1)]:	e ≥ 0:	e < 0:	DW test:
20949.095	131	100	0.574

Note: 45 cases deleted with missing values

Beta Coefficient Table

	Variable:	Coefficient:	Std. Err.:	Std. Coeff.:	t-Value:	Probability:	
	INTERCEPT	94.214					
1	**B2 PL**	0.87	0.21	0.24	4.18	0.00	
2	**B3 ET**	5.98	1.17	0.33	5.13	0.00	
3	**C4 ASJB**	-6.14	1.87	-0.19	3.29	0.00	
4	**D1 Metronome**	-0.02	0.03	-0.04	0.73	**0.46**	*
5	**A7. Col. GPA**	5.07	2.02	0.16	2.51	0.01	

Confidence Intervals and Partial F Table

	Variable:	95% Lower:	95% Upper:	90% Lower:	90% Upper:	Partial F:
	INTERCEPT					
1	**B2 PL**	0.46	1.28	0.53	1.21	17.45
2	**B3 ET**	3.68	8.28	4.05	7.90	26.33
3	**C4 ASJB**	-9.82	-2.46	-9.22	-3.06	10.82
4	**D1 Metronome**	-0.09	0.04	-0.08	0.03	0.54
5	**A7. Col. GPA**	1.09	9.05	1.73	8.40	6.30

* Items that are not significant at the p≤.05

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Multiple Regression

8 Independent Variables
(Identified by Stepwise Regression (Backward), p≤.05)

Number	R	R^2	Adjusted R^2	RMS Residual:
243	0.569	0.324	**30.1%**	12.147

Analysis of Variance Table

Source	DF:	Sum Squares:	Mean Square:	F-test:
REGRESSION	8	16558.808	2069.851	14.029
RESIDUAL	234	34525.743	147.546	**p = .0001**
TOTAL	242	51084.551		

Residual Information Table

SS[e(i)-e(i-1)]:	e ≥ 0:	e < 0:	DW test:
23769.597	136	107	0.688

Note: 33 cases deleted with missing values

Beta Coefficient Table

	Variable:	Coefficient:	Std. Err.:	Std. Coeff.:	t-Value:	Probability:	
	INTERCEPT	99.787					
1	**B2 PL**	0.92	0.20	0.26	4.69	.00	
2	**B3 ET**	4.95	1.19	0.28	4.15	.00	
3	**B3 TH**	3.27	1.16	0.19	2.83	.01	
4	**C4 ASO**	**-1.10**	0.99	-0.06	1.10	**.27**	*
5	**C4 ASJB**	**-4.47**	1.78	-0.14	2.51	.01	
6	**C4 PL**	0.34	0.37	0.05	0.92	**.36**	*
7	**D2 SO**	0.11	0.05	0.14	2.53	.01	
8	**D1 Metronome**	**-0.05**	0.03	-0.10	1.68	**.10**	*

Confidence Intervals and Partial F Table

	Variable:	95% Lower:	95% Upper:	90% Lower:	90% Upper:	Partial F:
	INTERCEPT					
1	**B2 PL**	0.53	1.30	0.60	1.24	21.99
2	**B3 ET**	2.60	7.30	2.98	6.92	17.24
3	**B3 TH**	0.99	5.56	1.36	5.19	7.99
4	**C4 ASO**	-3.06	0.86	-2.74	0.55	1.22
5	**C4 ASJB**	-7.97	-0.96	-7.41	-1.53	6.29
6	**C4 PL**	-0.39	1.07	-0.27	0.95	0.85
7	**D2 SO**	0.03	0.20	0.04	0.19	6.41
8	**D1 Metronome**	-0.11	0.01	-0.10	0.00	2.81

* Items that are not significant at the p≤.05

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Exploratory Multiple Regression

7 Independent Variables

(Using Important Items identified by Stepwise Reg., and then selecting additional items through trial-and-error method.)

Number	R	R^2	Adjusted R^2	RMS Residual:
240	0.603	0.363	**34.4%**	11.848

Analysis of Variance Table

Source	DF:	Sum Squares:	Mean Square:	F-test:
REGRESSION	8	7	18567.998	18.898
RESIDUAL	234	232	32564.464	**p = .0001**
TOTAL	242	239	51132.462	

Residual Information Table

SS[e(i)-e(i-1)]:	e ≥ 0:	e < 0:	DW test:
25430.647	132	108	0.781

Note: 36 cases deleted with missing values

Beta Coefficient Table

Variable:	Coefficient:	Std. Err.:	Std. Coeff.:	t-Value:	Probability:
INTERCEPT	95.661				
B2 PL	0.96	0.19	0.28	5.11	0.00
B3 ET	5.43	1.14	0.31	4.75	0.00
B3 TH	2.72	1.14	0.16	2.38	0.02
C4 ASJB	-5.81	1.77	-0.18	3.29	0.00
D2 SO	**0.14**	0.05	0.17	2.67	0.01
D2 ET	**0.16**	0.06	0.17	2.62	0.01
D2 OT	-0.16	0.07	-0.13	2.27	0.02

Confidence Intervals and Partial F Table

Variable:	95% Lower:	95% Upper:	90% Lower:	90% Upper:	Partial F:
INTERCEPT					
B2 PL	0.59	1.33	0.65	1.27	26.10
B3 ET	3.18	7.68	3.54	7.32	22.59
B3 TH	0.47	4.97	0.83	4.61	5.67
C4 ASJB	-9.30	-2.33	-8.74	-2.89	10.80
D2 SO	0.04	0.25	0.05	0.23	7.11
D2 ET	0.04	0.28	0.06	0.26	6.89
D2 OT	-0.30	-0.02	-0.27	-0.04	5.17

Guttman's Partial Correlation

		Item	MAT3 (Subtests) Tonal Memory ST1 R	R^2	Melody Recog. ST2 R	R^2	Pitch Recog. ST3 R	R^2	Inst. Recog. ST4 R	R^2	MAT4 (Subtests) Composer ST1 R	R^2	Texture ST2 R	R^2	Aud.-Vis. Discrim. ST3 R	R^2	Chord Recog. ST4 R	R^2	Cadence ST5 R	R^2	Summary of Subtests* Summed (-)	(+)	≥3	Tests MAT3 R	R^2	MAT4 R	R^2	Grand Total GT R	R^2
			.37	14%	.47	22%	.41	17%	.32	10%	.40	16%	.28	8%	.34	11%	.28	8%	.30	9%				.53	28%	.44	19%	.52	27%
No. of Col. courses	1	B2 PL	.05	0%	.19	4%	.12	1%	.13	2%	.13	2%	.04	0%	.14	2%	.08	1%	.15	2%	1	8	1	.19	4%	.19	3%	.21	5%
	2	B2 ET	.02	0%	.02	0%	.06	0%	.13	2%	.07	0%	.10	1%	.08	1%	.07	0%	.12	1%	1	8	0	.07	0%	.09	1%	.10	1%
	3	B2 TH	-.08	1%	-.06	0%	-.10	1%	-.15	2%	-.07	1%	-.06	0%	-.04	0%	-.15	2%	-.05	0%	8	0	0	-.14	2%	-.12	1%	-.14	2%
	4	B2 IE	.12	1%	.10	1%	.10	1%	.03	0%	-.03	0%	.04	0%	-.03	0%	.10	1%	-.07	1%	3	6	0	.14	2%	.01	0%	.07	0%
	5	B2 GA	.03	0%	-.15	2%	-.03	0%	-.03	0%	.11	1%	.04	0%	.12	1%	.09	1%	-.08	1%	3	6	0	-.08	1%	.10	1%	.03	0%
Grades in Col. courses	6	B3 PL	-.15	2%	-.07	1%	-.15	2%	.18	3%	.06	0%	-.07	1%	-.15	2%	-.05	0%	.06	0%	6	3	1	-.12	2%	-.04	0%	-.09	1%
	7	B3 ET	.21	4%	.31	9%	.34	11%	.08	1%	.08	1%	.04	0%	.11	1%	.19	3%	.21	4%	0	8	1	.39	15%	.19	4%	.32	10%
	8	B3 TH	.10	1%	.14	2%	.11	1%	.13	2%	.04	0%	.00	0%	.12	2%	-.01	0%	.07	1%	1	8	0	.08	1%	.08	1%	.09	1%
	9	B3 IE	.06	0%	.18	3%	.11	1%	.07	1%	-.10	1%	-.09	1%	.20	4%	.24	6%	.04	0%	2	7	1	.15	2%	.06	0%	.11	1%
	10	B3 GA	.00	0%	-.10	1%	-.10	1%	.04	0%	-.04	0%	.09	1%	-.07	0%	-.12	1%	-.05	0%	6	3	0	-.09	1%	-.05	0%	-.07	1%
High School Music Activities	11	C4 ASB	-.04	0%	.10	1%	.23	5%	-.06	0%	.18	3%	-.01	0%	.13	2%	-.01	0%	-.02	0%	5	4	2	.13	2%	.12	1%	.14	2%
	12	C4 ASO	-.12	1%	-.02	0%	-.20	4%	-.12	1%	-.10	1%	-.12	1%	.06	0%	-.17	3%	-.10	1%	6	2	1	-.17	3%	-.14	2%	-.18	3%
	13	C4 ASJB	-.13	2%	-.03	0%	-.04	0%	-.18	3%	-.18	3%	-.15	2%	-.08	1%	-.16	2%	-.06	0%	6	1	2	-.12	1%	-.22	5%	-.20	4%
	14	C4 ASC	-.02	0%	-.14	2%	-.01	0%	-.06	0%	-.01	0%	-.01	0%	.08	1%	-.01	0%	.08	1%	7	2	0	-.09	1%	.03	0%	-.02	0%
	15	C4 CF	.13	2%	-.08	1%	-.17	3%	.15	2%	-.01	0%	-.05	0%	-.03	0%	.08	1%	.02	0%	5	4	1	-.03	0%	-.01	0%	-.02	0%
	16	C4 SE	-.08	1%	.05	0%	.14	2%	-.02	0%	.07	0%	.10	1%	.03	0%	.04	0%	.07	1%	2	7	0	.05	0%	.11	1%	.10	1%
	17	C4 MC	-.07	1%	.02	0%	-.12	1%	.11	1%	.05	0%	-.01	0%	.11	1%	-.05	0%	.02	0%	3	6	0	.05	0%	.05	0%	.01	0%
	18	C4 PL	.24	6%	.02	0%	.12	1%	.18	3%	.05	0%	.02	0%	-.07	1%	.15	2%	.03	0%	1	8	2	.20	4%	.05	0%	.14	2%
	19	C4 CCC	-.17	3%	-.01	0%	-.19	4%	-.18	3%	.21	4%	-.08	1%	.06	0%	-.03	0%	-.05	0%	6	1	3	-.21	4%	-.13	2%	-.19	3%
	20	C4 HSJB	-.05	0%	.08	1%	.03	0%	.20	4%	-.10	1%	.17	3%	.11	1%	.05	0%	.19	4%	2	7	3	.08	1%	.13	2%	.12	1%
	21	C4 CB	.09	1%	.17	3%	-.01	0%	-.22	5%	.04	0%	.05	0%	.13	2%	-.02	0%	-.07	0%	4	5	2	.06	0%	.06	0%	.07	0%
Practice Activities	22	D2 SC	.03	0%	.15	2%	.11	1%	-.01	0%	-.04	0%	.05	0%	-.13	2%	-.07	1%	.02	0%	4	5	0	.13	2%	.06	0%	.03	0%
	23	D2 ET	-.01	0%	.23	5%	.19	3%	-.01	0%	.13	2%	.09	1%	.06	0%	.04	0%	.02	0%	2	7	2	.19	4%	.13	2%	.18	3%
	24	D2 TA	-.10	1%	.09	1%	.06	0%	-.04	0%	.10	1%	.00	0%	.15	2%	.06	0%	.06	0%	2	7	0	.02	0%	.13	2%	.09	1%
	25	D2 BM	.09	1%	.15	2%	.08	1%	-.08	1%	-.04	0%	.00	0%	.00	0%	.04	0%	.01	0%	2	7	0	.12	2%	-.01	0%	.06	0%
	26	D2 SR	.07	0%	.19	3%	.18	3%	.00	0%	.11	1%	.02	0%	.01	0%	.12	2%	.12	1%	0	9	2	.19	4%	.13	2%	.18	3%
	27	D2 SO	.04	0%	.26	7%	.23	5%	-.02	0%	.07	0%	.09	1%	.11	1%	.04	0%	.06	0%	1	8	2	.24	6%	.13	2%	.20	4%
	28	D2 IM	.03	0%	.14	2%	.09	1%	-.04	0%	.15	2%	.04	0%	.04	0%	.01	0%	.04	0%	1	8	0	.11	1%	.11	1%	.13	2%
	29	D2 OT	-.03	0%	-.03	0%	.10	1%	-.14	2%	-.04	0%	-.08	1%	.04	0%	-.04	0%	.00	0%	6	3	0	-.01	0%	-.05	0%	-.04	0%
Other Activities	30	D1 Metro.	-.05	0%	-.09	1%	-.04	0%	.04	0%	.03	0%	-.17	3%	.01	0%	.08	1%	-.07	1%	4	5	1	-.07	0%	-.06	0%	-.07	1%
	31	B1a. Pratice	.02	0%	-.09	1%	-.03	0%	-.15	2%	.10	1%	-.06	0%	.02	0%	-.12	1%	.02	0%	5	4	0	-.08	1%	.01	0%	-.04	0%
	32	B1b. Study	-.03	0%	.01	0%	-.01	0%	.11	1%	-.09	1%	-.03	0%	-.01	0%	.07	0%	.02	0%	5	4	0	.01	0%	-.04	0%	-.02	0%
	33	A7. Col. GPA	.05	0%	.06	0%	.12	1%	-.09	1%	.13	2%	.09	1%	.01	0%	.09	1%	.08	1%	0	9	0	.09	1%	.14	2%	.14	2%
	34	A4. Yrs/Inst.	-.08	1%	-.22	5%	-.19	4%	-.12	1%	-.02	0%	-.01	0%	.03	0%	-.19	4%	-.14	2%	8	1	3	-.24	6%	-.09	1%	-.18	3%
	35	D7. MIN/Record	-.14	2%	.06	0%	-.08	1%	.12	1%	.01	0%	.12	1%	-.13	2%	-.01	0%	-.07	0%	5	4	0	-.04	0%	-.02	0%	-.03	0%
	36	D8. MIN/Person	.15	2%	.24	6%	.18	3%	-.01	0%	.04	0%	-.04	0%	-.01	0%	.07	0%	-.01	0%	3	6	2	.24	6%	.01	0%	.13	2%

Shade = Negative "r"s; Box = Percentage of Variance Larger than 3%

* (-) = No. of subtests with neg."r"s; (+) = No. of subtests with positive "r"s; and Box ≥3 = Important subtests (≥3

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Iterated Principal Axis

Summary Information

Factor Procedure	Principal Axes Analysis
Extraction Rule	Roots greater than one
Transformation Method	Orthotran/Varimax
Number of Factors	6

Measures of Variable Sampling Adequacy

Total matrix sampling adequacy: .536

B2 PL	.71	C4 CCC	.60
B2 ET	.71	C4 HSJB	.52
B2 TH	.75	C4 CB	.24
B2 IE	.68	D2 SC	.17
B2 GA	.85	D2 ET	.20
B3 PL	.58	D2 TA	.31
B3 ET	.75	D2 BM	.26
B3 TH	.74	D2 SR	.35
B3 IE	.63	D2 SO	.23
B3 GA	.73	D2 IM	.19
C4 ASB	.71	D2 OT	.15
C4 ASO	.71	D1 Metron...	.52
C4 ASJB	.42	B1a. Pract...	.65
C4 ASC	.65	B1b. Study	.66
C4 CF	.44	A7. Col. GPA	.70
C4 SE	.49	A4. Yrs/ I...	.79
C4 MC	.58	D7. MIN/a...	.60
C4 PL	.63	D8. MIN/p...	.53

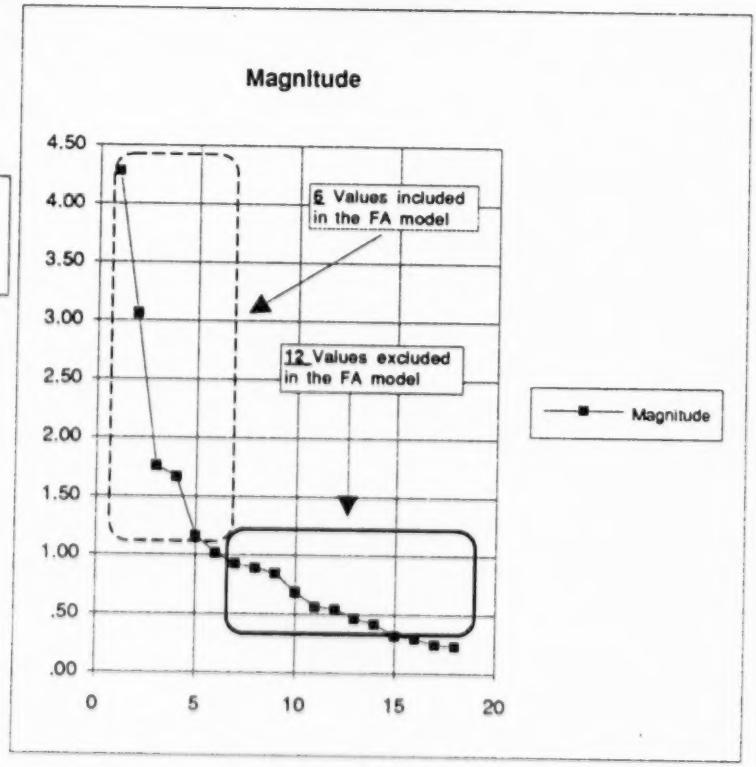
Bartlett Test of Sphericity- DF: 665 Chi Square: 2485.77 P: .0001

Eigenvalues and Proportion of Original Variance

	Magnitude	Variance Prop.
Value 1	**4.28**	**.12**
Value 2	**3.06**	**.09**
Value 3	**1.76**	**.05**
Value 4	**1.67**	**.05**
Value 5	**1.16**	**.03**
Value 6	**1.02**	**.03**
Value 7	.93	.03
Value 8	.89	.03
Value 9	.85	.02
Value 10	.69	.02
Value 11	.57	.02
Value 12	.55	.02
Value 13	.47	.01
Value 14	.42	.01
Value 15	.32	.01
Value 16	.30	.01
Value 17	.25	.01
Value 18	.24	.01

Variance summed for Values 1 to 6 = **37%**

Scree Plots



Eigenvectors

Items	Vector 1	Vector 2	Vector 3	Vector 4	Vector 5	Vector 6	Vector 7	Vector 8	Vector 9	Vector 10	Vector 11	Vector 12	Vector 13	Vector 14	Vector 15	Vector 16	Vector 17	Vector 18
B2 PL	-.38	.24	.09	-.03	-.01	.19	.08	-.06	-.07	-.20	-.13	.04	.03	.03	-.06	.05	.11	-.05
B2 ET	-.31	.22	-.01	-.10	-.14	-.12	.06	.09	.15	.36	.04	.19	-.09	.07	.04	.18	-.03	.08
B2 TH	-.37	.25	.04	-.08	-.09	-.09	.01	.12	.18	.20	.18	.02	-.10	.00	.05	.17	.07	-.14
B2 IE	-.33	.21	.17	-.02	.07	.21	.06	-.02	-.06	-.27	.18	.04	.14	-.06	-.06	-.39	.08	.13
B2 GA	-.19	.23	.01	.03	-.04	-.03	-.10	.15	.07	-.10	.10	.08	.24	.03	.18	-.29	-.01	.00
B3 PL	-.11	-.06	.03	-.06	-.14	-.06	.11	-.18	-.25	.24	.24	.28	-.05	-.03	.04	-.14	.13	.06
B3 ET	-.15	-.28	.07	-.03	-.12	-.01	.02	.19	-.06	.02	-.20	.01	.01	.15	.20	-.31	-.37	.07
B3 TH	-.18	-.36	.16	-.18	-.11	.04	-.10	.07	.04	.06	-.14	.17	.18	.04	.00	.03	-.22	.03
B3 IE	-.05	-.12	.10	-.07	.01	-.23	-.10	.06	.18	.00	.12	.01	-.15	-.17	-.35	-.04	-.01	.01
B3 GA	-.13	-.35	.03	-.14	-.14	-.15	-.15	.02	.17	-.06	-.01	.09	.04	.04	-.18	.01	.35	.20
C4 ASB	-.15	-.21	-.06	.28	-.10	.27	.07	.01	-.21	.22	-.02	-.11	.18	-.24	.24	.00	.05	.01
C4 ASO	-.16	-.12	-.13	.29	-.03	.12	.22	-.11	.01	-.02	-.19	.12	-.24	-.28	-.04	.15	.00	.17
C4 ASJB	-.02	-.08	.04	.22	-.37	-.02	-.17	-.31	.12	-.01	.09	.17	-.17	.13	.18	.00	-.28	.17
C4 ASC	-.10	-.09	-.22	.34	.00	-.06	-.05	.04	.33	-.11	-.24	.17	-.05	.14	-.01	.02	.09	-.01
C4 CF	.02	-.07	-.19	.08	-.18	.08	-.12	.37	-.18	-.02	.04	.07	-.10	.28	.02	-.18	.20	.05
C4 SE	-.01	.00	-.20	.21	-.12	-.03	.37	.28	-.24	.00	.16	.11	.12	.08	-.13	.11	-.09	-.20
C4 MC	.13	.11	-.08	-.04	-.19	.12	-.16	.04	-.06	.18	.01	.01	-.35	-.11	.19	.11	-.28	.42
C4 PL	-.13	-.14	-.22	.28	.08	.02	.00	.01	-.12	-.02	.10	-.14	.11	-.41	-.06	.13	.17	.04
C4 CCC	.02	-.03	-.19	.16	-.05	.08	.06	.03	.13	.05	.14	.22	-.15	-.01	-.38	-.28	.12	.02
C4 HSJB	.04	.03	.01	.09	-.30	.11	-.04	-.15	.09	.03	.13	-.04	.15	.17	.17	.09	.13	.25
C4 CB	.00	.01	-.06	.02	-.09	-.03	.01	.01	.05	.24	.06	-.05	.39	-.18	.41	-.34	-.18	.19
D2 SC	.00	.00	.11	.10	.23	.32	-.28	-.01	.08	.45	-.17	.01	-.10	.22	.10	-.18	.14	-.04
D2 ET	.07	-.13	.27	.11	.00	.22	.28	.29	.14	-.21	.39	-.09	.01	.09	-.10	.12	-.07	.06
D2 TA	-.07	-.01	.20	-.01	.21	-.02	-.52	.02	.04	.00	.04	.03	.03	-.81	.00	.23	-.08	.03
D2 BM	.08	.19	-.04	-.03	-.23	-.31	-.05	.12	.21	-.04	.28	.14	-.24	-.03	.03	.06	.10	.22
D2 SR	.09	.20	-.02	.11	-.37	-.12	.07	.01	.02	.12	.33	.22	.28	-.10	-.06	.08	.06	-.19
D2 SO	-.13	-.08	-.70	-.44	.14	.06	.18	.14	.04	-.08	.06	.04	.01	.04	.19	.00	.20	-.12
D2 IM	.06	.05	.03	.09	-.05	-.15	.24	.34	-.18	.21	.31	.25	.07	.09	.19	.29	.21	.05
D2 OT	-.05	-.04	.14	.00	.04	-.16	.14	.06	.54	.07	.25	.26	.12	.21	.24	.12	.04	.02
D1 Metro...	-.16	-.02	-.02	.14	.05	-.07	.04	.34	.06	.17	.01	.32	.07	.37	.24	.01	.28	.03
B1a. Pra...	-.17	-.09	.11	.14	.21	-.22	.14	.05	.00	.03	.04	.11	.03	.01	.04	.19	.18	.23
B1b. Study	.13	-.03	.09	.08	-.13	-.22	.06	.17	.17	.13	.06	.06	.01	.14	.28	.03	.06	.26
A7. Col. ...	-.27	-.36	.07	-.22	-.23	-.09	.12	.02	.06	.09	.03	.00	.03	.14	.09	.07	.24	.03
A4. Yrs/...	-.26	.19	-.05	.08	-.14	.10	.21	.05	.20	.22	.01	.07	.14	.09	.03	.15	.22	.24
D7. MIN/...	-.16	-.07	-.07	.31	.33	-.32	.17	.03	.12	.18	.03	.12	.26	.18	.07	.13	.04	.07
D8. MIN/...	-.05	.07	-.07	.08	.12	-.38	.03	.36	.01	.05	.16	.21	.25	.09	.15	.10	.11	.09

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Orthogonal Transformation Solution-Varimax

Factor 1: Academic Experience (Number of College Courses)
Factor 2: Student Outcome (College Grades)
Factor 3: Study Activities-Individual
Factor 4: High School Music Activities
Factor 5: Critical Evaluation
Factor 6: Musical Maturity (i.e., philosophy/enlightment)

Proportionate Variance Contributions (TOTAL MODEL)							Communality Summary		Variable Complexity -Orthotran /Varimax	
	Orthogonal	29%	22%	13%	15%	11%	10%				
	Oblique	29%	22%	14%	15%	11%	10%				
Items Grouped by Factor		Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	SMC	Final Estimate	Orthogonal	Oblique
B2 PL		.91	.06	-.04	-.01	.08	-.16	.87	.86	1.09	1.06
B2 TH		.87	.11	-.07	-.05	.15	.13	.88	.81	1.16	1.13
B2 IE		.80	.02	.02	-.08	.11	-.24	.82	.71	1.25	1.21
B2 ET		.74	.11	-.10	-.04	.09	.21	.83	.63	1.28	1.27
A4. Yrs/ Inst		.64	-.01	-.01	.18	-.02	.04	.56	.44	1.17	1.19
B2 GA		.53	-.09	.00	.00	.08	.09	.38	.30	1.16	1.17
A7. Col. GPA		.13	.91	-.10	.05	.08	-.04	.79	.87	1.09	1.04
B3 TH		-.01	.77	-.01	-.02	.05	-.23	.47	.36	1.19	1.12
B3 GA		-.12	.70	-.07	.07	.11	.00	.61	.53	1.14	1.16
B3 ET		.00	.57	.04	.13	.08	-.12	.65	.64	1.25	1.15
B3 IE		-.06	.28	.03	-.09	.21	.07	.21	.14	2.36	2.74
B3 PL		.14	.26	.01	.02	.01	.06	.32	.09	1.63	1.66
D2 SO		.06	.17	-1.08	.22	-.17	.14	.83	1.30	1.23	1.14
C4 ASJB		.00	.18	.34	.28	-.13	.13	.44	.26	3.20	3.13
D2 ET		-.19	.08	.34	-.04	-.05	-.33	.78	.27	2.78	2.75
B1b. Study		-.25	-.02	.25	-.05	.02	.21	.28	.17	3.05	3.08
C4 ASC		.03	.02	.00	.56	.19	.04	.44	.35	1.24	1.26
C4 PL		.05	.09	-.09	.54	.20	-.10	.43	.36	1.50	1.33
C4 ASB		.09	.28	.11	.51	-.01	-.30	.47	.45	2.44	2.27
C4 ASO		.15	.15	.04	.51	.11	-.15	.41	.34	1.70	1.49
C4 SE		.01	-.07	.01	.37	-.03	.14	.42	.15	1.38	1.39
C4 CCC		-.07	-.09	-.04	.32	-.08	.01	.21	.12	1.43	1.37
C4 CF		-.08	.06	-.04	.29	-.18	.07	.33	.13	2.17	2.07
D7. MIN/audio		.09	.00	-.03	.33	.63	.00	.48	.52	1.56	1.53
B1a. Practice		.14	.18	.06	.10	.48	-.09	.38	.30	1.67	1.36
D8. MIN/person listenin		.07	-.10	-.06	.04	.34	.27	.37	.21	2.29	2.15
C4 MC		-.08	-.21	.02	-.03	-.34	.13	.32	.18	2.12	1.73
C4 HSJB		.02	.00	.21	.12	-.28	.09	.21	.14	2.48	2.77
D2 TA		.10	.05	.07	-.17	.25	-.20	.48	.15	3.45	3.09
D1 Metronome		.21	.10	.01	.21	.23	-.03	.41	.15	3.38	3.19
D2 OT		.03	.13	.10	-.09	.20	.01	.55	.06	2.89	2.87
D2 BM		.05	-.18	.10	-.12	-.08	.48	.61	.30	1.61	1.46
D2 SC		.01	-.14	.06	.00	.02	-.42	.57	.20	1.28	1.40
D2 SR		.09	-.22	.27	.04	-.24	.40	.55	.35	3.30	3.41
D2 IM		-.06	-.11	.14	.00	.06	.16	.44	.07	3.36	3.43
C4 CB		.01	.00	.00	.08	-.06	.10	.20	.02	2.57	2.70
										Average	1.94 1.90

Heywood Effect

Boxes = Items that might have a relationship (r>.21) with another Factor

Box = Important independent variables r ≥ .60;
Shade = Not important Independent variables ≤.30.

Box = Complex Independent Variables

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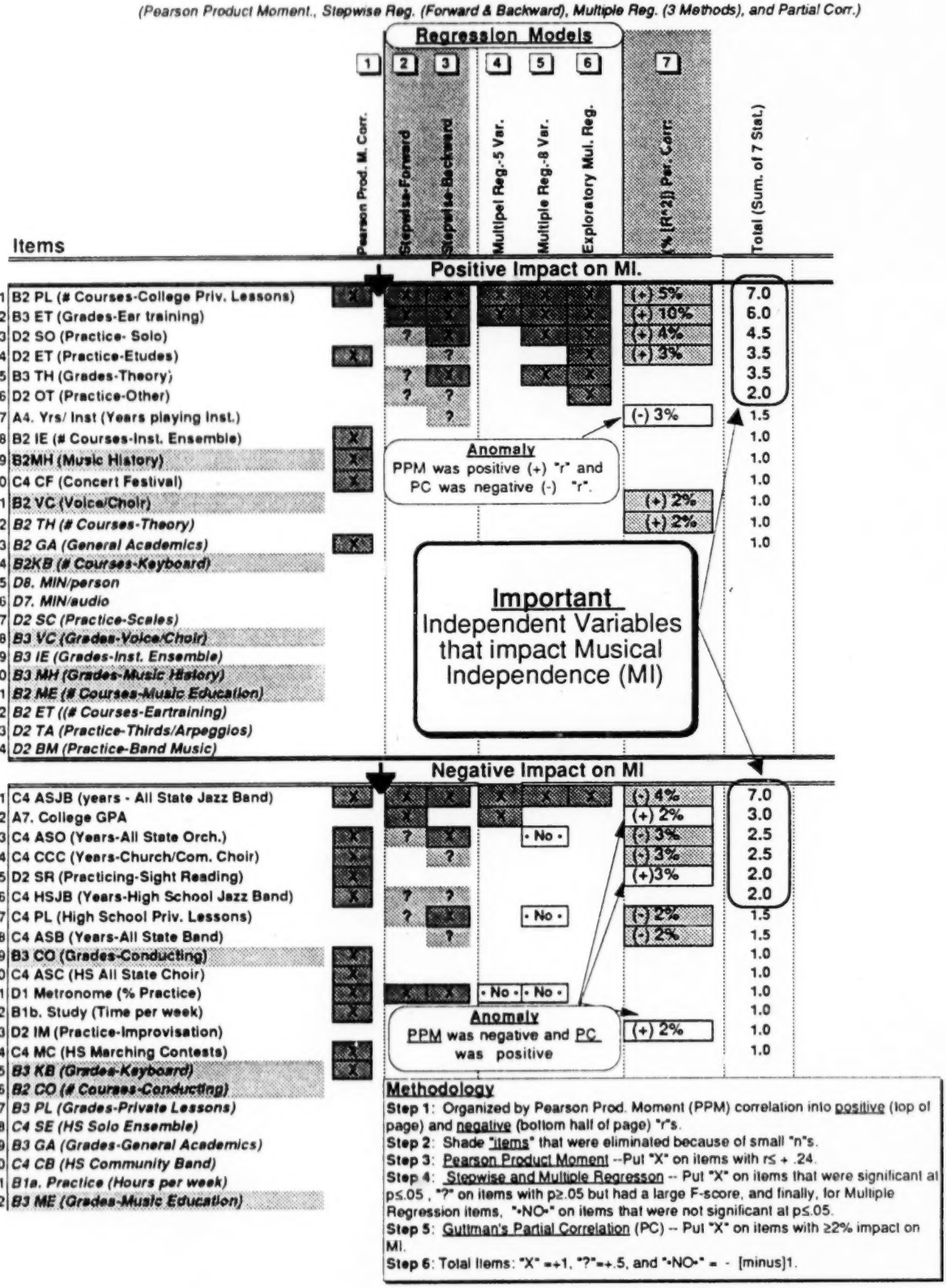
Appendix L

Summary for 7 Statistical Treatments

(Pearson Product Moment., Stepwise Reg. (Forward & Backward), Multiple Reg. (3 Methods), and Partial Corr.)



Methodology

Step 1: Organized by Pearson Prod. Moment (PPM) correlation into positive (top of page) and negative (bottom half of page) "r"s.

Step 2: Shade "items" that were eliminated because of small "n"s.

Step 3: Pearson Product Moment --Put "X" on items with r≤ + .24.

Step 4: Stepwise and Multiple Regresson -- Put "X" on items that were significant at p≤.05 , "?" on items with p≥.05 but had a large F-score, and finally, for Multiple Regression items, "•NO•" on items that were not significant at p≤.05.

Step 5: Guttman's Partial Correlation (PC) -- Put "X" on items with ≥2% impact on MI.

Step 6: Total Items: "X" =+1, "?"=+.5, and "•NO•" = - [minus]1.

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